Digitized by the Internet Archive
in 2012 with funding from
University of Guelph, University of Windsor, York University and University of Toronto Libraries

http://archive.org/details/reportonontarioh02onta

CA2ON
XC 2
1985
N25 v.2

Ontario

Select Committee on Energy

Report on Ontario Hydro Draft Demand/Supply Planning Strategy

Volume II

1st Session, Thirty Fourth Parliament
37 Elizabeth II

CA2ON
XC2
-1985
N25
v. 2

Ontario

LEGISLATIVE ASSEMBLY
ASSEMBLÉE LÉGISLATIVE

Select Committee on Energy

Report on Ontario Hydro Draft Demand/Supply Planning Strategy

Volume II

1st Session, Thirty Fourth Parliament
37 Elizabeth II

MEMBERS OF THE SELECT COMMITTEE ON ENERGY

DOUGLAS CARROTHERS
Chairman of the Committee

JAMES McGUIGAN
Vice-Chairman of the Committee

MIKE BROWN

MICHEAL C. RAY
Windsor-Walkerville

BRIAN CHARLTON

ROBERT RUNCIMAN

SAM L. CUREATZ

LARRY SOUTH

RUTH A. GRIER

GINO MATRUNDOLA

BARBARA SULLIVAN

TANNIS MANIKEL
Clerk of the Committee

JERRY RICHMOND
Research Officer

K. LEWIS YEAGER
Research Officer

JEFF PASSMORE
Consultant to the Committee

DAVID ARGUE
Consultant to the Committee

TABLE OF CONTENTS

APPENDIX A - Summary of Major Viewpoints, Recommendations and Concerns prepared by Jerry Richmond and Lewis Yeager, Research Officers, Legislative Research Service

APPENDIX B - Final Presentation to the Ontario Select Committee on Energy by Passmore Associates International, Consultants to the Committee

APPENDIX A

Summary of Major Viewpoints,
Recommendations and Concerns

Prepared by

Jerry Richmond
Lewis Yeager

Research Officers

Legislative Research Service

F193,3/88-89

ENERGY COMMITTEE HEARING SUMMARY: MAJOR VIEWPOINTS, RECOMMENDATIONS AND CONCERNS RE: ONTARIO HYDRO'S DRAFT DEMAND/SUPPLY PLANNING STRATEGY (DSPS)*

Reflects Committee Hearings and submissions
to the Select Committee on Energy, August-November 1988

Prepared for:

Select Committee on Energy

Prepared by:

Jerry Richmond and Lewis Yeager
Research Officers
Legislative Research Service

December 1988

* Projects prepared by the Legislative Research Service are designed in accordance with the requirements and instructions of the Committee making the request. The views expressed should not be regarded as those of the Legislative Research Service or of the individual preparing the project.

TABLE OF CONTENTS

	Page No.
LIST OF SUBMISSIONS	i
INTRODUCTION	1
Report Overview	1
Organization	1
FUNDAMENTAL ISSUES	2
DSPS IN GENERAL AND GENERAL STRATEGIC PRINCIPLES	3
Treatment in DSPS	3
Draft Demand/Supply Planning Strategy	3
1. General Strategic Principles	3
Submissions/Testimony	3
General Principles	3
Reserve Margin	9
Process of Power System Planning	10
Energy Policy and Financial Issues	13
General Issues	13
Debt Guarantee	13
Financial Impact	14
GENERAL DEMAND/SUPPLY STRATEGIES: COST	16
Treatment in DSPS	16
2. General Demand/Supply Strategies: 2.1 Measures	16
Submissions/Testimony	16
UNCERTAINTY/LOAD FORECASTING	19
Treatment in DSPS	19
2.2 Response to Uncertain Growth	19
Submissions/Testimony	19
RESOURCE SMOOTHING	27
Treatment in DSPS	27
2.3 Resource Smoothing	27
Submissions/Testimony	27
RESOURCE PREFERENCES	28
Treatment in DSPS	28
2.4 Resource Preferences	28
Submissions/Testimony	28
PUBLIC CONSULTATION	29
Treatment in DSPS	29
2.5 Public Consultation	29
Submissions/Testimony	29
DEMAND MANAGEMENT: DEMAND REDUCING OPTIONS	32
Treatment in DSPS	32
3 Demand Management: 3.1 Demand Reducing Option	32
Submissions/Testimony	32
Achievement of Demand Management Targets	37

TABLE OF CONTENTS, CONTINUED

	Page No.
DEMAND MANAGEMENT: LOAD SHIFTING OPTIONS	40
Treatment in DSPS	40
3.2 Load Shifting Options	40
Submissions/Testimony	40
DEMAND MANAGEMENT: DEMAND INCREASING OPTIONS	41
Treatment in DSPS	41
3.3 Demand Increasing Options	41
Submissions/Testimony	41
DEMAND MANAGEMENT: MUNICIPAL UTILITIES	42
Treatment in DSPS	42
3.4 Cooperation with Municipal Utilities	42
Submissions/Testimony	42
DEMAND MANAGEMENT: TIMING	44
Treatment in DSPS	44
3.5 Timing of Demand Management	44
Submissions/Testimony	44
DEMAND MANAGEMENT: RESEARCH AND DEVELOPMENT	45
Treatment in DSPS	45
3.6 Demand Management-Research and Development	45
Submissions/Testimony	45
DEMAND MANAGEMENT: PROMOTION & EDUCATION	47
Treatment in DSPS	47
3.7 Demand Management - Promotion & Education	47
Submissions/Testimony	47
DEMAND MANAGEMENT: RATE INDUCED	48
Treatment in DSPS	48
3.8 Rate Induced Demand Management	48
Submissions/Testimony	48
DEMAND MANAGEMENT: FINANCIAL INCENTIVES	50
Treatment in DSPS	50
3.9 Financial Incentives for Demand Management	50
Submissions/Testimony	50
DEMAND MANAGEMENT: ENERGY EFFICIENCY STANDARDS	52
Treatment in DSPS	52
3.10 Energy Efficiency Standards	52
Submissions/Testimony	52
DEMAND MANAGEMENT: OTHER BARRIERS	54
Treatment in DSPS	54
3.11 Other Barriers	54
Submissions/Testimony	54
INDEPENDENT, PARALLEL OR NON-UTILITY GENERATION	56
Treatment in DSPS	56
4 Independent Generation	56
Submissions/Testimony	56

TABLE OF CONTENTS, CONTINUED

	Page No.
SUPPLY OPTIONS: GENERAL	66
Treatment in DSPS	66
5 Supply Options: 5.1 Supply General	66
Submissions/Testimony	66
SUPPLY APPROVALS	70
Treatment in DSPS	70
5.2 Supply Approvals	70
Submissions/Testimony	70
PLANT SIZE	
Treatment in DSPS	74
5.3 Unit Sizes, Plant Size Flexibility	74
Submissions/Testimony	74
SITE ACQUISITION	75
Treatment in DSPS	75
5.4 Site Acquisition	75
Submissions/Testimony	75
EXISTING PLANT	76
Treatment in DSPS	76
5.5 Existing Plant	76
Submissions/Testimony	76
ALTERNATIVE GENERATION	77
Treatment in DSPS	77
5.6 Alternative Generation	77
Submissions/Testimony	77
ALTERNATIVE FUELS - NATURAL GAS OR OIL	80
Treatment in DSPS	80
Submissions/Testimony	80
HYDRAULIC GENERATION	82
Treatment in DSPS	82
5.7 Hydraulic	82
Submissions/Testimony	82
NUCLEAR GENERATION	84
Treatment in DSPS	84
5.8 Nuclear	84
Submissions/Testimony	84
General Considerations	84
Nuclear Costs	86
Reliance Upon CANDU Technology	87
Waste Disposal and Decommissioning	90
Maintaining the CANDU Technology	92
International Perspectives on Nuclear Power	95

TABLE OF CONTENTS, CONTINUED

	Page No.
HARE NUCLEAR SAFETY REVIEW (1988): MAJOR CONCLUSIION	97
Overall Safety	97
Major Conclusion 1 - Overall Safety	97
Ontario Hydro Corporate Affairs	97
Major Recommendation 1 - The Human Element	97
Pressure Tube Issues	97
Major Recommendation 2 - Integrity of Pressure Tub	97
Other Conclusions and Recommendations	98
Research and Development	98
Other Ontario Hydro Practices	98
Reactor Performance	98
Operating System	98
Risk of Accidents	98
Emergency Measures	99
Health Matters	99
Regulations	99
FOSSIL (COAL) GENERATION	100
Treatment in DSPS	100
5.9 Fossil	100
Submissions/Testimony	100
COMBUSTION EMISSIONS AND THE GREENHOUSE EFFECT	104
Submissions/Testimony	104
POWER PURCHASES	106
Treatment in DSPS	106
6 Purchases	106
Submissions/Testimony	106
POWER EXPORT	111
Submissions/Testimony	111
ENABLING LEGISLATION	112
Submissions/Testimony	112
Power Corporation Act Review	112
Energy Efficiency Act	112
Ontario Energy Board Act	112
Municipal Act	112
POWERLINE PLANNING AND IMPACTS	113
Submissions/Testimony	113
MISCELLANEOUS	114
Submissions/Testimony	114

LIST OF SUBMISSIONS

Groups/Organizations/Individuals Which Submitted Briefs and/or Appeared Before the Committee

AECL	Atomic Energy of Canada Ltd.; presentations by D.S. Lawson, President, CANDU Operations; Dr. K.W. Dormuth, Director of the Geological and Environmental Science Division; appearance on September 27, 1988
AECL Professional Employees	Society of A.E.C.L. Professional Employees, appearance/presentation on September 27, 1988
Ahearne	John Ahearne, Vice-President and Senior Fellow, Resources for the Future, Washington, D.C.; appearance on September 27, 1988
AMPCO	Association of Major Power Consumers in Ontario, submission dated June 24, 1988; appearance on September 19, 1988
Bechtel	Herb Harmer, Bechtel Group Inc., presentation on September 15, 1988
Berkowitz	Dr. Michael Berkowitz, Professor, Department of Economics, University of Toronto, appearance on October 3, 1988
Blachford	D.E.F. Blachford, A rural district residential customer, Kingston, Twp.: submission June 1988.
Blind River	Town of Blind River, brief and presentation, September 23, 1988
Blue Apple - Jones	Blue Apple Consulting Inc. - B. Jones; review of study on Natural Gas as an Electricity Supply Option, September 20, 1988 presentation
Canadian Earth Energy Association	Canadian Earth Energy Association, correspondence of August 2, 1988; brief and presentation on September 20, 1988
CEA	Canadian Electrical Association; submission dated August 30, 1988; appearance on September 19, 1988

CIL	CIL Inc., submission dated June 29, 1988.
CNA	Canadian Nuclear Association, submission of July 8, 1988; resubmission of brief presented to Select Committee on Energy, 1985; appearance before Select Committee on September 26, 1988
Canadian Nuclear Society	Canadian Nuclear Society; submission dated September 21, 1988
Chalk River Technicians	Chalk River Technicians and Technologists - Local 1568; submission/appearance on September 27, 1988
Coal Association of Canada	Coal Association of Canada, Calgary, submission: "Background to the Canadian Coal Industry," August 2, 1988 and "Coal and Ontario's Energy: A Practical Partnership," October 3, 1988
Connor-Lajambe	Hélène Connor-Lajambe, presentation on October 3, 1988
Consulting Engineers of Ontario	Consulting Engineers of Ontario; submission filed September 19, 1988
CRESAP	Cresap Review: Cresap - Management Consultants, "A Productivity Action Plan for Ontario Hydro" - June 8, 1988 (documentation provided by Ontario Hydro)
Deep River	Town of Deep River, Mayor Lyall Smith; submission filed September 22, 1988 and appearance on September 27, 1988
Diener	Steven Diener, presentation and submission on Cogeneration Market Opportunities, September 20, 1988
Dow Chemical	Dow Chemical Canada Inc., submission dated September 15, 1988 and appearance October 4, 1988
Du Pont	Du Pont Canada Inc., submission prepared by S.I. Olvet, Manager, Energy and Strategic Planning, Energy and Materials, July 8, 1988
Econoler, Inc.	Econoler, Inc. and Canadian Association of Energy Service Companies, presentation, September 15, 1988

Electrical Manufacturers' Association	Electrical and Electronic Manufacturers' Association of Canada, submission dated June 30, 1988
Elliot Lake	Town of Elliot Lake, correspondence of July 19, 1988 and Committee travel to Elliot Lake on September 23, 1988
Elliot Lake Chamber of Commerce	Elliot Lake Chamber of Commerce, brief and presentation, September 23, 1988
EMR - employment impacts	Department of Energy, Mines and Resources; Employment Impacts of Energy Management Investments; appearance on October 3, 1988
Energy Probe	Energy Probe; presentation and submission of September 26, 1988
Enserve	Stephen Probyn, Enserve Financial Corporation, brief and presentation, September 15, 1988
Etobicoke Hydro	Etobicoke Hydro; submission and presentation of Sept. 19, 1988
Ferahian	R.H. Ferahian; correspondence filed on September 26, 1988
FESA	Federation of Engineering and Scientific Associations, brief/presentation of September 19, 1988
Franklin	Robert Franklin, Chairman and President, Ontario Hydro, presentation to Committee on August 2, 1988 and appearance on October 5, 1988 (documentation provided by Ontario Hydro)
Franklin, Re Cresap	Cresap Review: Memorandum signed by Robert Franklin, Chairman and President, Ontario Hydro, June 9, 1988 (documentation provided by Ontario Hydro)
Geller	Howard Geller, American Council for an Energy-Efficient Economy; appearance on September 20, 1988
Hamrin	Janice Hamrin, Independent Power Producers Association, presentation on September 13, 1988

Hansens	Robert and Helen Hansen; Willowdale, Ontario; letter dated October 3, 1988
Hare	Dr. Kenneth Hare, Chairman, Ontario Nuclear Safety Review; Chairman, Climate Program Planning Board of Canada; Chancellor, Trent University; appearance on September 22, 1988
Hare Nuclear Safety Review	The Safety of Ontario's Nuclear Power Reactors, F. Kenneth Hare, Commissioner, Ontario Nuclear Safety Review, 1988
Hunter	Judy Hunter, President-Bridlewood (Kanata) Residents Hydro Line Committee, presentation/appearance on September 27, 1988
INCO	INCO Ltd., submission dated June 30, 1988
Interministerial Review	Review by Government Ministries of Ontario Hydro's Draft Demand/Supply Planning Strategy, Report to the Minister of Energy, July 1988
IPPSO	Independent Power Producers' Society of Ontario, submission filed on August 2, 1988 and appearance on September 20, 1988
James River-Marathon Ltd.	James River-Marathon Ltd., Marathon, Ontario, submission filed on September 12, 1988
Joint Industry Task Force	Joint Industry Task Force, submissions of June and August 1988 and presentation of September 19, 1988
Linde - Union Carbide	Union Carbide Canada Ltd., Gas Products, letter of July 5, 1988
Litchfield	James Litchfield, Director of Planning, Northwest Power Planning Council, presentation on September 13, 1988
Mackesy	Florence Mackesy (Toronto); letter filed on October 6, 1988
Marbek/Torrie	Marbek Resource Consultants Ltd. and Torrie Smith and Assoc., presentation on September 15, 1988

Marcus	William B. Marcus, Principal Economist, JBS Energy Inc., presentation on September 21, 1988 and a report to the Committee.
Markham Hydro Electric Commission	Markham Hydro Electric Commission, submission filed August 2, 1988
Ministry of Energy	Ministry of Energy, brief and presentation, September 14, 1988
Multistream Power	Multistream Power Corporation, Ted Burdette and Jay Shepherd, presentation on September 28, 1988
Municipal Electric Association	Municipal Electric Association, submission/appearance on September 22, 1988
NEPOOL	New England Power Pool (NEPOOL), Philip Otness, Executive Director, brief and presentation, September 21, 1988
Nirabro Industries	Nirabro Industries, Tim Richardson, presentation on September 21, 1988
OMAA	Ontario Metis and Aboriginal Association; appearance/submission on September 19, 1988
ONGA	Ontario Natural Gas Association, submission dated July, 1988 and appearance on September 21, 1988
Ontario Home Builders' Association	Ontario Home Builders' Association, R-2000 Program, brief and presentation, September 15, 1988
Ontario Hydro	Appropriate excerpts from Ontario Hydro presentation of DSPS to the Select Committee (Aug. 4-5, Aug. 8-11, 1988 plus tour of Richview Control Centre and Research Lab August 12, 1988); and Ontario Hydro's appearance before the Committee on October 4 and 5, 1988. Note: Ontario Hydro's in camera appearance before the Committee on September 28, 1988 to discuss power purchases from neighbouring provinces is not included in this Summary.
Ontario Mining Association	Ontario Mining Association, submission dated June 30, 1988

Ontario Ministry of Energy	Ontario Ministry of Energy, brief and presentation, September 14, 1988
Orillia Water, Light and Power	Orillia Water, Light and Power Commission, brief and presentation on September 21, 1988
Osten	Jim Osten, DRI Energy, highlighting on September 28, 1988 of study on The Economic Impacts of Purchasing Electricity (1987) prepared for the Ontario Ministry of Energy
Paehlke	Bob Paehlke, Trent University, presentation on September 28, 1988
Passmore Associates	Passmore Associates International, Consultants in New Energy Sources/Private Power Development - consultants to the Committee, Final Presentation to the Ontario Select Committee on Energy, November 7, 1988
Pasquan	Raymond Pasquan, Submission entitled "In Home Storage Batteries to Reduce Peak Demand"
Pavey	M.A. Pavey, consultant, submission and testimony dated September 28, 1988
Peden	William Peden, Energy Mines and Resources Canada, presentation on October 3, 1988 on "energy efficiency and parallel/cogeneration"
Robinson	Dr. John B. Robinson, Associate Professor, Department of Environment and Resource Studies, University of Waterloo; article on "New approaches to utility forecasting" submitted September 12, 1988 and presentation on September 14, 1988
Sceptre Resources	Sceptre Resources Ltd., presentation and submission of September 20, 1988
Schumacher Mine	Schumacher Mine, Giant - Timmins Division, submission dated June 29, 1988

Select Committee on Energy (1986)	Final Report on Toward a Balanced Electricity System, Second Session, Thirty-third Parliament, July 1986.
Solcan Ltd.	Solcan, Ltd., submission dated August 19, 1988.
Technical Advisory Panel	Review of Ontario Hydro's Draft Planning Strategy; report of the Electricity Planning Technical Advisory Panel [EPTAP] to the Minister of Energy, July 1988. Presentation on September 12, 1988
Thexton	Ted Thexton, Advisor, Nuclear Power, Energy Mines and Resources Canada; appearance on September 27, 1988. Also supplementary information filed in November 1988 on "AECL and the Future of the Canadian Nuclear Industry"
Township of the North Shore	Township of the North Shore, brief and presentation, September 23, 1988
TransCanada and Consumer Gas	TransCanada PipeLines and Consumer Gas; presentation/submission on September 22, 1988
Ullsten	Ola Ullsten, Swedish Ambassador to Canada; appearance on September 26, 1988
UNISYS	UNISYS Canada, (computer supplier), submission dated July 25, 1988
University of Windsor, Faculty of Engineering	University of Windsor, Faculty of Engineering, An Analysis of Demand-Side activities within the Electric Industry in various jurisdictions including Ontario, filed November 1988.
USW	United Steel Workers of America, District 6, brief and presentation, September 23, 1988
Waterpower Association of Ontario	Waterpower Association of Ontario, submission dated July 29, 1988 and appearance on September 27, 1988
Williams	Glanville Williams, Consultant, Coal Combustion Technology Study; appearance on September 22, 1988

Windsor Utilities Commission	Windsor Utilities Commission, submission dated June 14, 1988 and appearance on September 22, 1988
Wong	Hon. Robert Wong, Ontario Minister of Energy, appearance on afternoon of August 2, 1988
Woodley	Richard Woodley; Kanata, Ontario, submission filed on September 12, 1988
W.C. Woods Ltd.	W.C. Woods Ltd. (Manufacturer of Energy-Efficient Freezers), Mr. Muffet, presentation September 14, 1988

INTRODUCTION

Report Overview

In accordance with earlier discussions with the Committee Chairman and Committee Members, the attached report summarizes the major viewpoints, recommendations and concerns raised by groups, organizations or individuals who have made written submissions to and/or who also appeared before the Select Committee on Energy during its August-October, 1988 hearings on Ontario Hydro's Draft Demand/Supply Planning Strategy (DSPS). Additional written submissions made to the Committee following the completion of the public hearings have been addressed where they add new insight or additional information.

This summary also includes major viewpoints put forward by Ontario Hydro during its appearances before the Committee. The key findings or recommendations of major recent provincial energy reports such as the recommendations of the previous Select Committee on Energy (1985-86), Hare Nuclear Safety Review (1988), Interministerial Review (1988) and the Energy Planning Technical Advisory Panel (1988) are also included in this summary.

No attempt has been made to reproduce every opinion expressed during lengthy testimony by over 80 contributors. Rather, an objective selection of as wide as possible a cross-section of testimony has been included.

Organization

To aid the Committee in its deliberations, the various recommendations and concerns have been grouped under subject headings which, to the greatest degree possible, reflect the 52 elements of Ontario Hydro's actual draft strategy (i.e. Chapter 12 of DSPS). In some cases additional subject headings are included to reflect additional matters raised before the Committee. After each recommendation or concern, the abbreviation of the group(s), or organization(s), or name of the group or individual who raised the matter appears. It is anticipated that this summary will be of particular assistance to the Committee in formulating its report to the Legislature.

This document consolidates the key concerns and recommendations made to the Committee or put forward in various submissions and reports by witnesses. For further details on the viewpoints presented, the actual written submissions, reports or transcripts of the Committee's public hearings should be consulted.

FUNDAMENTAL ISSUES

Note: Among the issues which might form a component of the Committee's report are the following:

- What basic approach should be taken to ensure the future provision of reliable, economic power to which Ontario has become accustomed?
- Planning for or attempting to mitigate uncertainty in the load forecast.
- Timing (lead times) associated with various demand/supply options.
- Appropriateness/response to Ontario Hydro's draft strategy: Committee response to the specific strategy elements.
- Seriousness of Ontario Hydro's commitment to demand management and parallel generation: approach to removal of institutional, financial or legal barriers.
- Capital, financial, employment, etc., implications of demand management as compared to supply options.
- Measures to improve assessment of potential for demand management and independent generation.
- Once new supply is needed, is it appropriate for Ontario Hydro to plan large-scale generation and transmission increments or explore smaller-scale alternatives?
- Assessment of the true costs of the nuclear option (retubing, decommissioning, and radioactive waste disposal) and impact upon viability of alternatives.
- Financial implications of alternative plans.

DSPS IN GENERAL AND GENERAL STRATEGIC PRINCIPLES

Treatment in DSPS

Draft Demand/Supply Planning Strategy

The Demand/Supply Planning Strategy must be consistent with the Corporate Goal which is:

> **"to meet the requirements of the Ontario community for electric service, including the manner of its provision, so as to result in the greatest overall benefit to that community and in the lowest cost (customer's average unit energy cost) to the customer for that service over the long term."**

Each annual Demand/Supply Plan will be developed based on the following strategic considerations:

1. General Strategic Principles

1.1 The primary objective of demand/supply programs is to contribute to customer satisfaction.

1.2 Reliability is paramount.

1.3 Low customer cost is vital.

1.4 Ontario Hydro must ensure that its activities are conducted in an environmentally and socially acceptable manner.

1.5 Rates must continue to be based on cost.

Submissions/Testimony

General Principles

- DSPS is a set of principles, guides and priorities which provides general direction in the development and selection of definitive demand and supply plans.

(Ontario Hydro, Presentation 11,
Introduction to Planning Strategy,
L McConnell)

- Flexibility and diversity are key to Ontario's future electricity supply.

(Franklin)

- DSPS contains five priority strategic directions: maintain and improve existing system; pursue aggressive demand management; encourage independent and self-generation; develop economic hydraulic sites; keep open option for major new power stations; purchase and replace old plants.

(Ontario Hydro, Presentation 11,
Introduction to Planning Strategy,
L McConnell)

- The strategy gives high priority to demand management, non-utility generation and orderly development of the remaining hydro supply in Ontario. Ontario must plan now for major new supply; major purchases and/or major fossil units and/or major nuclear units. Darlington will meet the 1987 median load growth forecast to the mid 1990s. There is an urgency to make new commitments.

  (Ontario Hydro, Final Presentation, L McConnell)

- The Ministry of Energy is responsible for providing advice to the Government on energy policy issues. Its objectives are to ensure that an adequate supply of energy is available at reasonable cost to consumers and with minimal environmental impact; to promote conservation and efficiency of energy use; and to encourage research and development of new energy sources and technologies.

  In keeping with its mandate, the Ministry has a responsibility for developing policy on electricity planning matters. Ontario Hydro, in turn, is expected to plan its activities within the framework of Government's public policy objectives, including those relating to energy.

  (Ministry of Energy)

- Ontario Hydro's corporate goal does not reflect a commitment to sustainable development or the conservation of resources. The Ministry of the Environment strongly supports the conservation of energy to minimize environmental impact.

  (Interministerial Review; response of the Ministry of the Environment)

- The Panel believes that there is probably more potential in what are broadly referred to as demand options than Hydro seems to suggest in its strategy document. We also believe that independent generation, both small hydro installations and thermal plants, could prove to be more attractive than currently projected.

  (Technical Advisory Panel)

- Beyond the economic priorities to be served are the environmental and social objectives of the province. The Draft Demand/Supply Planning Strategy addressed these requirements and elevates their consideration to an equal status with the economic priorities. This is consistent with public expectations and recognizes the inherent advantage electricity has in contributing to improvements in the quality of both the environment and lifestyles of the province.

  (CEA)

- A final general comment concerns the number of strategic principles. The draft strategy contains 52 strategic elements among which priorities should be more clearly stated.

  (Interministerial Review; response of the Ministry of Energy)

- We believe Hydro should develop a more meaningful statement of its goal. Our view is that Hydro should seek to lower the total cost of services derived from electricity (such as heating, refrigeration, lighting, and mechanical power, which we refer to as electric services) even if the effect is to increase the unit cost of the electricity itself. Ontario Hydro should restate its goal to include specific reference to minimizing the total long-term cost of the electric services desired by the people of Ontario, consistent with safety, flexibility, reliability, and acceptable environmental impact.

  (Technical Advisory Panel)

- In laying out its general strategic principles, Ontario Hydro has captured the dominant priorities by recognizing the importance of meeting customer requirements reliably and cost-effectively. It cannot, however, dictate those needs or predict them with faultless accuracy. For this reason, the utility rightly stresses the need for a flexible approach to meeting future electricity requirements. Electricity must contribute to Ontario's future economic competitiveness, not hinder it.

  (CEA)

- Ontario Hydro should produce, as part of its resource development plan, a scenario where environmental protection would be top priority. This scenario should identify differences in options and costs from the recommended strategy.

  (Select Committee on Energy, [1986])

- The Ministry of the Environment considers the examination of both demand and supply options by Ontario Hydro compatible with good environmental planning. The Ministry supports those elements in the draft strategy which reduce the consumption of non-renewable resources and promote the concept of sustainable development. While Ontario Hydro recognizes and plans to abide by the current regulations to protect environmental parameters (air quality, water quality and quantity, noise and vibration), it should realize that these regulations provide maximum limits for pollutants and that Ontario Hydro has a responsibility to minimize environmental damage.

  (Interministerial Review;
  response of the Ministry of the Environment)

- Hydro should be committed to doing what it can to minimize damage to the environment in its area of operations. Nevertheless, Ontario Hydro should only have to meet environmental requirements that govern all segments of society. Hydro should be allowed to operate as nearly as feasible to a private corporation in order to maintain its cost effectiveness.

  (Municipal Electric Association)

- While the Ministry of Agriculture and Food acknowledges Ontario Hydro's commitment to conduct its activities in an environmentally and socially acceptable manner, the Ministry is concerned that the current high standards for approving the development of new supply sources be maintained. The Ministry supports Ontario Hydro's request to streamline the process but will act on any proposed changes which weaken the existing process.

  (Interministerial Review;
  response of the Ministry of Agriculture and Food)

- The Ministry of Natural Resources supports Ontario Hydro's intention to undertake activities in a manner that is socially and environmentally acceptable. Since much of the Ministry's planning occurs within the context of integrated resource management principles, Ontario Hydro is encouraged to involve the Ministry closely in its planning process to ensure these principles are addressed.

  (Interministerial Review;
  response of the Ministry of Natural Resources)

- Counter to Ontario Hydro's view contained in the draft strategy, Ontario Hydro could undertake specific programs based on social and economic benefits to specific industries or regions. MITT believes these objectives can be pursued within Ontario Hydro's corporate goals, using differential rate structuring, for example. MITT also notes that Hydro Quebec has long been active in programs and activities designed to promote economic objectives in Quebec.

  (Interministerial Review;
  response of the Ministry of Industry,
  Trade and Technology)

- In reference to economic issues, the strategies proposed by Ontario Hydro are supportive of the Ministry's economic policy objectives. In the development of subsequent plans, Ontario Hydro should give detailed consideration to the economic development impacts of its activities.

  (Interministerial Review;
  response of the Ministry of Treasury
  and Economics)

- The ready availability of competitively priced electric power has been an essential location factor for Northern Ontario's resource industries. Therefore, the Ministry of Northern Development and Mines would like to see Ontario Hydro reinforce the development mandate of the Ministry by adopting a planning strategy which promotes Ontario Hydro as an instrument of economic development. Specifically, the Ministry would like to see Ontario Hydro's corporate goal reflect a stronger economic development mandate.

  (Interministerial Review;
  response of the Ministry of
  Northern Development and Mines)

- Customer cost means total customer cost and includes: the cost of electricity supply (generation, transmission and distribution); and customer utilization costs.

  (Ontario Hydro, Presentation 111C,
  Customer Cost, L McConnell)

- Customer satisfaction includes a number of priorities, the most important of which are reliability of supply, environmental protection and minimizing adjustments in lifestyle.

  (Municipal Electric Association)

- The Select Committee should recommend to government that:

  (a) Ontario Hydro should proceed immediately with the implementation of all economic and environmentally acceptable demand side options;

  (b) Ontario Hydro should proceed as expeditiously as possible to commit the new supply facilities necessary to provide energy security well into the next century;

  (c) Ontario Hydro should immediately proceed with the identification of sites and routes which could be required for such new facilities as may be indicated by the highest foreseeable growth in electricity demand to the year 2010. Pre-approval of such sites and routes would increase Ontario's planning flexibility by greatly reducing lead times. (This is similar to a recommendation of the previous Select Committee on Energy which is yet to be acted on); and

(d) Existing planning approval process including environmental hearings be reviewed with a view to stream-lining the process and imposing a reasonable time limit on the proceedings.

(Joint Industry Task Force)

- We are convinced that there is no single source of future electrical energy but, rather, we believe a strategy of employing a combination of sources will be found to meet the needs for flexibility on a daily, annual and on-going basis. DSPS identifies this and we are fully in support.

(UNISYS)

- Support in principle expressed for full range of strategies enumerated in DSPS.

(Consulting Engineers of Ontario)

- Commitment to the demand/supply options, to ensure future power needs are met, should also stress continued respect for the competence and professionalism of Ontario Hydro staff. This advantage would be threatened by possible shortages and uncertainty as to future power supply reliability.

(FESA)

- Ontario's energy supplies must meet three basic criteria: firstly, energy supplies must be adequate to our needs; secondly, energy supplies must be affordable; and thirdly, energy supplies must be compatible with a clean environment.

(Wong)

- If one were to order the priorities of the criteria from the point of view of the information technology industry, they would be:

  - Quality;
  - Reliability;
  - Environmental Impact; and
  - Cost.

(UNISYS)

- A reasonable level of capacity should be maintained to ensure reliability.

(Municipal Electric Association)

- Strong support expressed of the process and content of the Ontario Hydro Report 666SP, and the addition of the dimension of power quality to meet some widely accepted/acceptable standard to those criteria already identified for the choice amongst options was recommended.

(UNISYS)

- We believe the draft Demand/Supply Planning Strategy is an excellent example of a broad consultative process for planning future energy strategy. It is clear that to ensure Ontario's growth and development is not constrained by energy shortages, a multiple option approach involving both demand and supply side activities will be necessary. It is also clear that electricity is the energy form central to future economic growth and provides the right answer to important societal concerns regarding preservation of the environment.

(CEA)

- Support expressed for the concept of lowest total custom or cost, including both the cost of power service and the cost to customers of being deprived of it.

(AMPCO)

- Rates should continue to be based on cost and to ensure a fair and equitable cost allocation, costs should continue to be based on cost causality. All options should be assessed on long-term cost effectiveness and customer satisfaction.

(Municipal Electric Association)

- Support was expressed for rates to continue to be based on costs as a cornerstone of Ontario Hydro's mandate.

(AMPCO;
similar position expressed by Dow Chemical)

- Very brief power failures (voltage "dips") can cause disproportionate harm to operations, thereby undermining economic competitiveness and product quality. Therefore, a loss of supply reliability from current levels would be a serious blow to our plants, where today's reliability is already perceived as being barely tolerable.

(Du Pont)

- A reliable electric power supply is vital to the operation of mining and mineral processing facilities in Ontario.

(INCO)

- Equally as important to the supply (reliability) of electricity is the price for electricity.

(CIL)

- Concern was expressed regarding the future availability, at a reasonable price, of electrical power.

(Ontario Mining Association;
similar position expressed by James River-Marathon Ltd.)

- Agreement was expressed regarding Hydro's emphasis on and its priorities for the twin objectives:

  - reliability is paramount (most important);
  - low customer cost is vital (very important);

  as well as it's recognition of planning as an orderly response to uncertain growth. Further objectives were recommended:

  - maintaining reasonable stability and predictability of power rates;
  - that stability of rates be incorporated as a fourth major objective.

(AMPCO)

- That a study of what should constitute an energy policy for sustainable economic development be commissioned.

(Connor-Lajambe)

- Support was expressed for these principles. However, the most important principle is reliability. In considering the trade-off between cost and reliability, Ontario Hydro must recognize that the cost to the industrial customer of not having an adequate and reliable supply of power far outweighs the cost of perhaps paying for some excess capacity. However, at the same time, Ontario Hydro must do everything possible to keep its costs as low as possible.

  (INCO)

- Any strategy should include a reliable supply of 25 cycle power on a continuous basis for north-eastern Ontario.

  (Schumacher Mine)

- It is of major concern that necessary quantities of electrical power will be available at competitive rates well into the future.

  (James River-Marathon Ltd)

- We would recommend that existing standards for basic electrical power be re-examined and confirmed or upgraded as part of this strategic study to ensure that future needs of vital high technology systems can and will be met. It may be that there is a market for Ontario Hydro or local electrical energy suppliers or distributors in the provision of an alternate infrastructure to deliver high-grade reliable power to special users, observing that the cost of power is not now a significant system cost variable.

  (UNISYS)

- The Power Corporation Act and other relevant Acts should be amended to end the price discrimination and differential for rural and urban hydro customers.

  (Blachford, page 5)

- The Legislature should devise some vehicle so that rural district customers can have a voice in electricity matters, before Ontario Hydro or the Ontario Energy Board, to balance the influence of the Municipal Electric Association or Association of Major Power Consumers of Ontario.

  (Blachford, page 5)

Reserve Margin

- The optimum reserve margin for a system such as Ontario Hydro is generally accepted as being in the range of 22 to 28 per cent. An adequate reserve margin will be particularly important thought the 1990s when Ontario Hydro has said it will have to remove nuclear units from service for retubing and coal-fired units for retrofitting of scrubbers.

  Penalties for over-building are much less severe than for under-building, even assuming no export sales from excess reserve. It is apparent that under no planned circumstances should Ontario Hydro allow the reserve margin to fall below 18 per cent while under normal planning it would be prudent to plan for a larger reserve (given uncertainties in load forecast).

  (Joint Industry Task Force)

- That the planned reserve margin yielding a criterion of 25 system-minutes of unsupplied energy be reassessed to incorporate all possible sources of deviation of results from the plan, including all types of forecast error.

  (AMPCO)

- The planned reserve margin that is used in translating expected future demand into future need for generating capacity should be reviewed. The cost of maintaining the planned reserve margin should be assessed against the value of system reliability, particularly if electricity demand were to grow at a faster rate than expected.

(Interministerial Review;
response of the Ministry of Energy)

- By pooling generating reserves, NEPOOL is able to supply replacement power when a member utility's power plant shuts down unexpectedly, thus preventing a loss of power to the utility's customers. Because of this regional reserve margin, the power pool is able to cover its largest single contingency, such as the instantaneous loss of a large generating unit or transmission line. Clearly, it would be very costly for an individual utility to invest in the facilities necessary to meet such a reliability contingency on its own.

(NEPOOL)

- A reasonable level of reserve capacity should be maintained to ensure reliability.

(Municipal Electric Association)

Process of Power System Planning

- When the draft Hydro Report is revised and finalized, Hydro identify clearly and describe the analytical and decision-making steps in its proposed power system planning process.

(Technical Advisory Panel)

- The distinction between a strategy and a plan, and what each should include and exclude, is a matter which gave the Panel much difficulty as it reviewed Hydro's report and supporting material. More reflection on the purpose, a more succinct text, better definition of sequential events and decision-making steps, and a more disciplined exclusion of extraneous and peripheral material are among things that could improve Hydro's reports.

(Technical Advisory Panel)

- The links between the draft strategy and the analysis of the representative plans underlying the draft strategy could be clarified.

(Interministerial Review;
response of the Ministry of the Environment)

- With a proper power system planning process in place and operating, any interim initiatives should be:

  - specifically related to priorities emerging within the system planning process;

  - designed for flexibility and potential reversibility; lower cost, short lead time, alternative uses, and other characteristics increasing their probable value in the eventual plan; and

  - undertaken only with clear public consensus of their acceptability in advance of a completed plan.

(Technical Advisory Panel)

- Given the uncertainty of future electricity demand and the long lead times for building new, large-scale capacity, flexibility is important in system planning. While Ontario Hydro has dealt with flexibility in several strategic elements, the Ministry believes that flexibility is an important enough consideration in planning to be included as a strategic element on its own.

  (Ministry of Energy)

- Ontario Hydro integrate its research and development activities with its power system planning.

  (Technical Advisory Panel)

- For comparing and selecting options, the Panel believes that Hydro could develop and acquire state-of-the-art techniques that would yield more comprehensive assessments over the broad spectrum of demand and supply options which must now be analyzed. We stress the need for more emphasis on probability planning, risk mitigation, and the potential of a number of demand and supply options offering shorter lead times and more flexibility in sizing.

  (Technical Advisory Panel)

- The Ontario government establish by legislation an independent technical agency to conduct in-depth public review of Ontario Hydro's power system plans and to reject those plans, approve them, or approve them in part or with revisions.

  (Technical Advisory Panel)

- The Technical Advisory Panel has suggested an independent review of Ontario Hydro's plans. We are anxious to cooperate with the government in finding a better way. Until change is made, we will, of course, conform with current processes.

  (Ontario Hydro, Final Presentation,
  L McConnell)

- Reject the decision-making model Ontario Hydro proposes. These critical decisions about tradeoffs between cost, risk and the environment should not be Hydro's. They are properly ours -- the public's, the Government's, and yours.

  (Energy Probe)

- Make Hydro accountable to an independent decision-making body to whom you have delegated sufficient authority. It must conduct itself in an open forum where public input in welcomed. It must be able to see the value of spending thousands of dollars on good information that could save the Ontario economy billions of dollars in needless Hydro investments. It must not put itself in a position of being reliant solely upon Ontario Hydro for cost, impact and availability estimates.

  (Energy Probe)

- That an independent body of experts, able to hold public hearings, be given legislated authority to pass, modify or reject plans prepared by the utility.

  (Connor-Lajambe)

- The Ontario government should specify the social, environmental and political framework within which Ontario Hydro's planning is to take place.

  (Select Committee on Energy [1986])

- The Ontario Energy Board should be empowered to hold bi-annual public reviews of Ontario Hydro's Resource Development Plan, and publish a public report with recommendations to Cabinet.

  (Select Committee on Energy [1986])

- The Ontario Energy Board should conduct a public review of the results of Ontario Hydro's demand and supply options study. This review should take place at least sixty days after a final report on the options and all supporting documents have been issued. Recommendations should be made to Cabinet in a public report.

  (Select Committee on Energy [1986])

- Ontario Hydro's draft resource development plan and supporting documents should be published sixty days in advance of the hearings in a form determined by the Ontario Energy Board.

  (Select Committee on Energy [1986])

- Would like to strongly endorse three conclusions of the Technical Advisory Panel:

  1) the DSPS document is confusing and unclear in key areas, so that there is a need for greater clarity about Hydro's overall direction and planning process;

  2) there is an underestimation of demand management potential in DSPS;

  3) it is important to have ongoing external review of the planning process. Ad hoc advisory reviews are no substitute.

  (Robinson: Testimony)

- In the process of securing the Northwest Power Act, it was felt that an independent planning body needed to be formed to overview and guide the utility's efforts to plan for resource development. This provision of the Northwest Power Act ultimately resulted in the formation of the Northwest Power Planning Council which I work for.

  Under the Act, the Council has three primary mandates. The first is to develop a long-range electric power plan for the Pacific Northwest region. The second is to develop an efficient wildlife program that will compensate for and help mitigate the impacts on our fish and wildlife resources of hydro power development. The third mandate was to conduct both of the two primary mandates, the power plan and the fish program, in a very open, public way and to emphasize with a high degree the need for active, meaningful public involvement in our planning processes.

  (Litchfield)

- Suggests that approval of new generating capacity be based on some international standard of end use efficiency; such as 95 percent of the level attained by countries that are good at it.

  (Paehlke)

- To deal with problems of lead times for new generation, one might base power supply planning upon a trajectory model of improvements gained in energy efficiency.

  (Paehlke)

- Recommends an arm's length body to advise on long-term supply needs.

(Paehlke)

- That the least-cost sources of energy, taking social costs and other externalities and risks into account, be selected first.

(Connor-Lajambe)

- Ontario Hydro meeds more public oversight. It is one of the few utilities in North America without ongoing regulation. An independent regulatory body operating through public evidentiary hearing with intervenor compensation is required. This regulation should cover approval of its plans and load forecasts, siting approval for any new generation, review of prices and contracts for parallel generation, and rate regulation. It may also be reasonable to give this body authority over the development of building and appliance standards similar to that held by the California Energy Commission. The regulatory body should be given a large enough staff to enable it not only to review Hydro's analysis but to conduct analyses and forecasts of its own. Given that the Ontario Energy Board already conducts hearings regarding Ontario Hydro's rate and plans, it is the logical choice for this responsibility through expansion of its authority rather than creating a new duplicative agency.

(Marcus: Report)

- Formally ask the government to respond promptly to your report, to get on with needed change, and to send Hydro a strong message before we are painted into a corner by the passage of time.

(Energy Probe)

- The Strategy will be modified in early 1989 after we have received the recommendations of the Select Committee.

(Ontario Hydro, Final Presentation, L McConnell)

Energy Policy and Financial Issues

General Issues

- As soon as you start to try and use Hydro as a policy instrument, you lose any ability to control the bottom line.

(Enserve)

Debt Guarantee

- Hydro's debt guarantee (i.e., financing costs faced by Ontario Hydro being lower than they would otherwise be without the debt guarantee) results in:

  - a lower cost of raising funds which results in a bias towards more capital-intensive technologies to produce electricity;

  - another effect of the debt guarantee is that electricity rates are too low. These lower electricity rates encourage greater demand for electricity, relative to the alternatives that might be used. Because of that, this demand is met by greater investment.

  If the debt guarantee was eliminated Hydro's cost of debt would certainly increase and the level of debt financing in Ontario Hydro's capital structure would be much lower.

(Berkowitz)

- With regard to the "crowding out effect" the opportunity costs of electric investments is represented by the sum of all we had to give up to be able to afford them:

  - we have sacrificed our manufacturing ability and in some regions incurred de-industrialization, just to try and retain the same degree of energy autonomy; and

  - that, in the process of building energy projects which often ended up as overcapacity, we have increased a deficit which will become more and more difficult to absorb with a proportionately weaker productive base.

(Connor-Lajambe)

- Ontario Hydro should not be allowed to plan based on a low discount rate. Its use of low discount rate causes it to choose to build capital-intensive plants based on the assumption that the faith and credit of the Province of Ontario is costless. Taxpayers and residents of Ontario are made poorer when Hydro plans resources based on the rate of inflation plus 4%, when much more profitable investments by small businesses and others are crowded out of the capital market. Moreover, ratepayers with higher costs of credit would prefer to spend less money now to receive savings later than are justified by a 4% discount rate.

(Marcus: Report)

- One of the problems that we have had over the past few years is crowding of capital markets by public sector institutions. Many economists will tell you that is one of the reasons why interest rates have remained high. I think it is important to try and restrict the government's dependency on capital markets and it is also debt that we all have on our shoulders. The indebtedness of the province is a liability of every one of its citizens.

(Enserve)

- Exploitation of energy resources is more likely to drain than to fill the coffers of a nation. Ontario may be the only region which improved both its energy, financial autonomy and its manufacturing position between 1971 and 1986 but both balances remain negative. Energy supply policies do not replace industrial policies.

(Connor-Lajambe)

- There is no indication of private investment being "crowded out" of the market due to the capital and financing requirements of Ontario Hydro.

(Berkowitz)

Financial Impact

- On financing, the Ministry of Treasury and Economics notes that should the Province's current financing strategy continue, it is unlikely that Hydro's market involvement in the most likely economic environment would adversely influence the Province's capital availability. Ontario Hydro indicates that capital market availability may be a problem under the high growth scenario. The Ministry endorses this concern and will continue to monitor Hydro borrowing levels on an on-going basis. The Ministry would pursue corrective action if excessive borrowing levels appeared likely.

(Interministerial Review;
response of the Ministry of
Treasury and Economics)

- The draft DSPS document generally could place more emphasis on levels of debt and borrowings as strategic considerations. The Ministry of Treasury and Economics recognizes that Ontario Hydro is a self-supporting entity and is expected to remain so. As such, Ontario Hydro does not currently pose a threat to the provincial credit rating. In order to ensure that Ontario Hydro does not become a source of concern to rating agencies, the Ministry will continue to monitor Hydro's debt levels and borrowing plans.

(Interministerial Review;
response of the Ministry of
Treasury and Economics)

- While it is beyond the term of reference of the Select Committee, a very thorough study of privatization of Ontario Hydro should be undertaken from as many viewpoints as possible. Contained in any privatization study would be the option of offering shares to the public and simultaneously gaining some equity capital which, in turn, would favourably impact on the organizational behaviour of Ontario Hydro.

(Etobicoke Hydro)

GENERAL DEMAND/SUPPLY STRATEGIES: COST

Treatment in DSPS

2. General Demand/Supply Strategies: 2.1 Measures of Cost

2.1.1 Ontario Hydro will aim to develop a mix of demand and supply options that provides electricity service to customers at lowest total customer cost.

2.1.2. The cost of social and environmental requirements will be included in cost evaluations of demand/supply options.

Submissions/Testimony

- In deciding which cost option to pursue, the cost criteria is the lowest total customer cost. The total customer cost includes the supply costs which are the responsibility of the utility. The total customer cost also includes the utilization cost which is normally the responsibility of the customer. With demand management, utilities will influence the utilization choices in some cases by incentives and may contribute towards utilization costs with financial incentives. The lowest total customer cost alternative is the lowest cost way for society to meet the need for an electricity service. **The "no losers" test which tends to minimize electricity rates but does not necessarily minimize total customer costs has been rejected.** This strategy may result in higher electricity rates for demand options compared to supply options - particularly if incentives are high. This strategy should always result in lower electricity bills in total to all customers.

  (Ontario Hydro,
  Presentation 112A,
  Measures of Cost, K Snelson)

- **When the 26,000 MW load meeting capability of the existing and committed system is compared with the load forecast the need date for new demand or supply resources is 1996 based on median forecast, 1992 based on upper forecast, and beyond 2005 based on the lower forecast.** However, with successful implementation of interim plans including 2000 MW of electricity efficiency and 1000 MW of load shifting by 2000 the need dates for additional resources beyond interim plans will be deferred to 2002 under the median forecast and 1995 under the upper forecast.

  (Ontario Hydro,
  Presentation 6,
  Need for New Resources, A Marriage)

- The Standard Cost method appears to discriminate in favour of baseload generation and against more valuable peaking resources (such as heating conservation programs). Furthermore, the fuel prices used in the Standard Cost method led to the screening out of gas-fired resources which should be given greater consideration because of their cost-effectiveness under plausible lower fuel price forecasts.

  (Marcus: Report)

- The Council was given a charge by Congress to plan for resource acquisition, relying on conservation as the highest priority resource. Congress told us, "Not only develop a power plan, but in your development of a power plan, you should establish and use a priority listing for resource acquisitions and conservation should be the highest priority or the number one priority resource."

  In fact, to provide it with extra emphasis, they directed the council to include conservation measures that cost up to 110 percent, or 10 percent more than similarly reliable and available generating resource alternatives. So we were to give conservation the highest priority and we were to provide, in fact, a cost advantage to it, to acquire conservation that was more costly than generating resource alternatives.

  The primary reason for the 10 percent cost advantage is that there are a number of attributes, demand side management measures that are not easily quantified but are generally felt to be positive. For example, it is commonly believed and felt that conservation has substantially less environmental impact overall than the development of new generating resources of almost any type. There are some limitations on that. We have spent a lot of time in the Pacific Northwest trying to deal with indoor air quality problems that tend to come along with improved energy efficiency in buildings. But nevertheless, on net, the environmental effects are felt to be considerably less.

  Additionally, conservation resources, because they are management exercises where essentially each building or each factory gives you the opportunity to conserve some energy, come in very small sizes and they can be scheduled to more closely meet your load requirements as loads grow.

  (Litchfield)

- To maintain reliability we believe that all the economically feasible demand and supply "options" must be exercised, from conservation and load-shifting through parallel generation, and including initiation of a full-scale generation plant project. This must be achieved without sacrificing cost-competitiveness relative to the outside world.

  (Du Pont)

- Electricity rates should lead costs. Revenue should track costs. Setting rates to track costs as proposed simply mirrors present costs that have resulted from historic planning both good and bad. Ontario Hydro forecasting can identify future cost trends and set objectives to minimize future costs. Rates should reflect identified objectives to help shape electricity use patterns to minimize costs into the future. Revenue must continue to be based on current costs.

  (Windsor Utilities Commission)

- If one were to take the position of the advocates of co-generation, that is the supply siders if we may borrow the term, then surely the use of the earth itself to produce energy is as deserving of grants and subsidies as co-generation by wind, solar or other methods.

  (Canadian Earth Energy Association)

- The basic requirements in the evaluation of options and plans are technical feasibility, reliability, environmental acceptance, social acceptance, customer satisfaction plus total customer cost, financial impacts, risks and flexibility, impact on provincial economy and energy security.

(Ontario Hydro,
Presentation 7,
Criteria Used to Evaluate Options, A Marriage)

- Ontario Hydro, when taking into account social acceptance, should consider the values and expectations of the majority rather than any particular special interest group.

(Municipal Electric Association)

- Environmental concerns are addressed by having to meet regulations and the associated costs are passed onto customers.

(Municipal Electric Association)

- From an environmental perspective, the analysis of the net cost/benefits of the various representative plans in the draft DSPS are unclear. An effort should be made by Ontario Hydro to identify and evaluate the intangible costs and benefits to society and the environment of the proposed demand and supply options.

(Interministerial Review;
response of the Ministry of the Environment)

UNCERTAINTY/LOAD FORECASTING

Treatment in DSPS

2.2 Response to Uncertain Growth

2.2.1 The load forecast will include upper and lower projections that cover a reasonable range of possible outcomes.

2.2.2 Contingency plans must be prepared that identify practical options to respond to upper and lower load projections.

2.2.3 Demand options will be implemented, and supply options will be committed, in time to meet the most likely load growth economically and reliably.

Submissions/Testimony

- Hydro will plan, through the preparation of contingency plans, the range in the load forecast, i.e. upper and lower projections, and not just the median forecast.

  (Ontario Hydro,
  Presentation 112B,
  M Rothman)

- The uncertainty in the load forecast is reflected in bandwidth around the median load forecast and in scenario construction.

  (Ontario Hydro,
  Presentation 112B,
  Load Forecast Bandwidth, M Rothman)

- Ontario Hydro is examining an alternative, forward-looking approach to bandwidth estimation which may narrow the load forecast bandwidth.

  (Ontario Hydro,
  Presentation 112B,
  Load Forecast Bandwidth, M Rothman)

- Ontario Hydro is in the process of applying more sophisticated end-use models to its forecasting.

  (Ontario Hydro,
  Presentation 4,
  Electricity Requirements, M Rothman)

- Hydro regards a five year short-term trend of growth as indicative of an emerging trend, and short-term forecasts are adjusted annually.

  (Ontario Hydro,
  Load Forecasting,
  L McConnell and M Rothman, August 9, 1988)

- Ontario Hydro's 1987 Primary Load Forecast for the year 2000 assuming 1000 MW of load reduction through efficiency improvement programs and 1000 MW shifted off peak through time of use rates is 28,400 MW which results in an average annual growth for peak of 2.2 percent and for energy of 2.5 per cent. However, it was, also noted that certain recent developments are not included in this forecast: the impact of the Free Trade Agreement, a corporate initiative for an additional 1000 MW of demand reduction through electricity efficiency improvements, and the short-term - 1988 - load update. A new long-term forecast will be completed in December 1988.

  (Ontario Hydro, Presentation 4,
  Electricity Requirements, M Rothman)

- We propose decisions be based on a total least risk cost planning process. This process will include a probabilistic evaluation of:

  - the modifications to plans if loads are higher than the median forecast to minimize shortages and maintain system economy.

  - the modifications to plans required if loads are lower than the median forecast to minimize surplus capacity and maintain system economy.

  - To illustrate the range of possible future outcomes, plans will be produced showing the development of the system if the load follows the upper, median and lower load forecast.

  (Ontario Hydro, Final Presentation, L McConnell)

- We believe that Ontario Hydro is using, or planning to use, very advanced and sophisticated load forecasting models including the REEPS, Commend, and IN DEPTH models.

  The resources devoted to these functions are appropriate in scale and in large measure unavoidable due to the input requirements for advanced forecasting models.

  (CRESAP, page 6)

- Ontario Hydro should use its end-use model as the primary tool for forecasting future demand for electricity. Additional resources must be assigned to the task of acquiring the necessary data to make the end-use model operational as soon as possible.

  (Select Committee on Energy [1986])

- Ontario Hydro urgently commit the financial and human resources necessary to enhance its forecasting capability, in particular to develop a comprehensive end-use forecasting system that incorporates appropriate economic techniques.

  (Technical Advisory Panel)

- Ontario Hydro modify its planning method to incorporate probability-based risk assessment for choosing among options.

  (Technical Advisory Panel)

- Ontario Hydro develop methods for determining the cost-effectiveness of resource options which incorporate the value of flexibility and the ability to manage risk.

  (Technical Advisory Panel)

- As the basis of its planning exercise, Ontario Hydro should develop a range of plausible scenarios based on end-uses. Alternative resource mixes must then be evaluated over a range of plausible scenarios, rather than a single line, "most probable" forecast.

(Select Committee on Energy [1986])

- What is urgently required now is not more predictions of future load, or estimates of the uncertainty range, but detailed end-use and exploratory analysis of the feasibility and impacts of the range of alternative electricity demand and supply options.

(Robinson: Article)

- The current predictive approach to forecasting used by Ontario Hydro has a number of problems, including:

  - inconsistency between system planning and DSPS roles;
  - difficulty of measuring natural and strategic conservation;
  - modelling problems;
  - uncertainty;
  - lack of integration of system planning, load forecasting and energy management.

  This approach could be abandoned and replaced with integrated demand/supply scenarios, using a range of economic forecasts and DSPS-type path analysis. This would allow the selection of preferred planning scenarios and continual updating of planning for uncertainty. The advantages would include:

  - examining desirable futures rather than most likely future;
  - consistent analysis of options;
  - overt recognition of importance of choice;
  - better demand-side analysis;
  - an integrated planning process.

(Robinson: Testimony)

- The watchword in the electric utility industry today is uncertainty. Ontario Hydro has started to plan for uncertainty but has not adequately considered all sources of uncertainty. The uncertainties not considered in its representative plans are likely to be greater than the differences among the plans. A better treatment of demand, fuel prices, nuclear and demand management costs, and the availability of parallel generation are among the most important uncertainties that must be incorporated in Ontario Hydro's planning process.

(Marcus: Report)

- That demand scenarios attuned to public needs and expectations be developed using bottom-up end use analysis.

(Connor-Lajambe)

- Prior to approval by the Board of Directors, a draft of Ontario Hydro's range of forecasts should made available to the public and distributed widely to experts and interested parties. The external committee for reviewing the draft forecasts should become a formal requirement of Ontario Hydro's planning process.

(Select Committee on Energy [1986])

- Prior to final approval of the forecast by the Ontario Hydro Board of Directors, the Ministry of Energy should be required to publish, in addition to its own forecast range, a formal response to Ontario Hydro's draft forecast range.

(Select Committee on Energy [1986])

- Ontario Hydro's 1987 load forecast (most likely case) is for 2.8 percent a year growth over the 1986 to 2000 period. Hydro expects demand management measures to reduce this growth rate to 2.6 percent. The Ministry agrees that Hydro's most likely case is within a range that is reasonable for planning purposes.

(Ministry of Energy)

- As part of the system load forecasting function, provision should be made for an external review by experts before the load forecast is approved and adopted. Emphasis should be placed on integration of the demand forecast with the supply/demand planning in order that the entire planning process is interactive - a change in one element should initiate an adjustment in the overall plan.

(Consulting Engineers of Ontario)

- From 1982-1987, NEPOOL's energy load grew at an annual compound rate of 4.5 percent, one of the highest growth rates in the United States. NEPOOL expects energy requirements to grow by 2.1 percent annually through 2003.

(NEPOOL)

- The demographic forecasts underlying Ontario Hydro's demand projections are in accord with the Ministry's in the medium-term but somewhat lower in the longer term. Ontario Hydro's long-run economic forecast for the Province is broadly consistent with other private forecasts.

(Interministerial Review;
response of the Ministry of Treasury
and Economics)

- The Ministry of Housing notes that Ontario Hydro's population forecast is 0.5 million lower than the February 1988 forecast figures by the Ministry of Treasury and Economics. This new population projection should be addressed in Hydro's demand forecast. In addition, the Ministry's housing requirement projections differ from those contained in Ontario Hydro's 1987 Long Term Load Forecast of December 1987.

(Interministerial Review;
response of the Ministry of Housing)

- As to load forecasting, the Panel was struck by the broad band of uncertainty about the magnitude of future Ontario electricity requirements. We propose that Hydro put even more effort into developing or acquiring forecasting techniques to reduce the analytical variations that are not inherent uncertainties.

(Technical Advisory Panel)

- Ontario Hydro improve the credibility and accuracy of its load forecasting by retaining the several forecasts it develops, giving the assumptions behind them, and explaining the reasons for the different assumptions and the correspondingly different forecasts.

(Technical Advisory Panel)
(Ontario Hydro,
Presentation 4,
Electricity Requirements, M Rothman)

- The Ontario Hydro basic forecast contains assumed penetration rates for electricity into the heating market which are far more important than natural conservation in determining the level of forecast demand.

(Marbek/Torrie)

- With regard to the difficulty of forecasting future requirements accurately, we are fully supportive of the requirement to envision several possible future demand curves and to prepare as appropriate, publicily-supported strategy to meet the most stringent demands, while maintaining flexibility to regularly modify those plans as the demand is defined.

(UNISYS)

- The current level of system reliability should not be compromised through undue reliance on strategies which have not yet been commercially applied to the Ontario market.

(Consulting Engineers of Ontario)

- Planning should immediately commence for meeting the upper demand growth scenario should it take place.

(Municipal Electric Association)

- To maintain flexibility, plans should include a diverse mix of supply and demand options which can be accelerated or delayed to match demand growth.

(Municipal Electric Association)

- Ontario Hydro has forecasted a growth rate of demand of 2.4 percent per year until 2005. Hydro has estimated that there is a 60 percent probability that the demand rate will be between 0 percent and 4.3 percent. By 2005 the difference between these projections would be larger than the present system. Ontario requires a strategy which will cope with this considerable range of uncertainty.

  One strategy would be to plan for the expected forecast and include contingency plans which will allow the flexibility to respond to high or low growth. This desired flexibility would be obtained through a combination of options which could be advanced or delayed without significant cost penalties. In addition, it would be beneficial to choose a strategy that would still be effective if conditions change and this could be achieved by diversifying the options chosen.

  It may also be beneficial to complete the planning phase of an option in readiness of high growth. This would be an inexpensive insurance against the cost of a supply shortage since planning costs are much less than construction costs. Early commitment for a particular option may not bring a severe cost penalty if it could displace expensive coal.

(Municipal Electric Association)

- It is prudent to be on the high side regarding forecasts and supply.

(Joint Industry Task Force: Presentation)

- The plan developed must be "fail-safe". Contingency plans that respond to upper and lower load projections must be processed through approval stages. Advance approval is necessary to minimize implementation timing and maintain maximum flexibility. Simply seeking improvements to the planning approval process to provide increased flexibility as proposed is inadequate.

(Windsor Utilities Commission)

- Over the past five years the increase in electricity demand has been approximately five per cent per year. The 2.5 per cent figure is a relic of 1978-83 experience when the province suffered through the economic slowdown and recession. The relationship between electricity demand and GPP growth is back on its historical linear track and the Task Force therefore believes that a growth rate of five per cent is a more prudent basis on which to plan demand and supply needs. Ontario Hydro should have effective plans to meet an increase in electricity demand of five percent per year.

(Joint Industry Task Force)

- Due to faster than expected load growth in recent years, we are concerned that there could be power shortages in Ontario in the mid to late 1990s. Timely decisions on demand management and committing new generation capacity are needed now to ensure that these shortages are of limited duration and magnitude.

  The Demand/Supply study estimates annual growth to be about 2.6% till about the year 2000. We suggest that the load growth could be closer to 4% over this period, which means the supply shortfall by 2000 could be closer to 8,000 MW than 4,000 MW.

(FESA)

- It is better to err on the side of adequacy of supply. The economic consequences of a shortage, especially if prolonged and of significant size, are much worse in their impact on consumers and the provincial economy, than a temporary surplus. A surplus can be handled by stretch-out of construction schedules, by enhanced exports of power to American markets, and by retiring older or less efficient capacity. A shortage means economic dislocations and costly stop-gap measures to be caught up.

(FESA; similar viewpoint expressed by CEA)

- Despite the recent experience of strong growth in electricity demand, the Ministry of Energy believes that Ontario's economic growth is likely to slow to a more sustainable long-term growth rate, and also that electricity demand is likely to continue to grow at a significantly slower rate than economic output. In this context, the uncertainty range encompassing Hydro's upper demand and lower demand forecasts appears to be too wide, and the Ministry suggests that the range should be reevaluated.

(Interministerial Review;
response of the Ministry of Energy)

- It will be seen that at a demand growth rate of 2.5 per cent additional demand/supply options will be needed by 1996. But if growth continues at 5 per cent, Hydro will fall below an 18 per cent reserve margin in 1991. Ontario Hydro has fallen well behind in planning system additions to the point where a shortage of supply now seems very likely to be a limiting factor for provincial economic development and growth.

  (Joint Industry Task Force)

- Because of continuing, long-sustained demand growth which consistently is outstripping forecasts and thereby delaying needed supply additions, we are concerned that Ontario is now at risk of drifting into a serious supply shortfall, possibly in the mid-1990s.

  (Du Pont, CIL)

- Annual growth in demand for electrical energy will continue to be higher than Ontario Hydro's recent forecasts at least throughout the next decade. There is little support for the soft energy path philosophy.

  The draft document (Section 6.1), clearly shows existing and committed generating capacity falling below the most probably load forecast in 1996, only seven years from now. We believe, there is evidence that Ontario Hydro's most probable load forecast estimate is low. There is little time left to make the necessary decisions to avoid this shortfall.

  (Chalk River Technicians)

- We strongly recommend that the forecasted annual growth be re-evaluated and that Ontario Hydro start planning immediately for a new bulk generative [sic] station.

  (CIL, INCO)

- Ontario's future growth will require increased supply in the near future and our major concern is that it will not be available when required.

  (Markham Hydro Electric Commission)

- It is imperative that alternative strategies be developed to meet the full range of possible consumer demand. To do otherwise would restrict the ability of the province to operate at its optimum level of economic development. Also we caution that the protracted length of the planning and approval process greatly reduces flexibility on the supply side and are alarmed by the possibility of electricity supply shortfalls in the 1990s.

  (Joint Industry Task Force)

- The system plan should be as flexible as possible and it should meet expected demand at minimum cost. Plans should be tested against the full range of possible outcomes to establish the costs of uncertainty. Any deviation from expected results will impose additional costs on an optimal system. Unused capacity and insufficient capacity are the two risks facing any plan. They are opposite risks, and they must be balanced. Forecasts need to be used with probability ranges.

  (AMPCO)

- Contingency plans for the adopted system should be made well in advance of any emergency and should be demonstrably implementable.

  (AMPCO)

- A review of the anticipated energy savings from demand side principles appear ambitious and unrealistic. We have a major concern that an over-reliance on such measures will result in a delay of the supply side options which would have a devastating effect on the province and its economy.

  (Markham Hydro Electric Commission)

- Increasing reliance on demand options increases forecasting uncertainty, particularly since the impact of such demand-reducing options as conservation has yet to be successfully measured by Ontario Hydro.

  (AMPCO)

- Concern was expressed that Ontario Hydro may have overestimated the effect of conservation and underestimated the new load that will be added to the system in the future.

  (INCO)

- Major concern expressed that DSPS states that between now and the year 2010 Ontario Hydro will have to invest between zero and $75 billion in new generating plants - and there is a 40% chance that even this estimate is wrong. There is something seriously wrong with an organization that wants to make billion dollar decisions that effect every resident of Ontario based on that kind of dubious analysis.

  (Woodley)

RESOURCE SMOOTHING

Treatment in DSPS

2.3 Resource Smoothing

2.3 To maintain flexibility and to reduce costs resource smoothing will be considered.

Submissions/Testimony

- A realistic plan must consider the ability to deliver each option. We call this program smoothing of delivery resources or simply "resource smoothing". To achieve resource smoothing, each alternative plan is examined and adjusted to make sure it is practical in terms of availability, cost, schedule and flexibility. However, the smoothing of delivery resources is not a primary criteria in developing alternative plans.

  (Ontario Hydro,
  Presentation 112D,
  Resource Smoothing, L McConnell)

- Resource smoothing is included in the strategy to reduce risk, increase flexibility and lower costs by allowing Ontario Hydro to adopt plans which smooth financial, manufacturing, construction and human resource requirements over time to avoid peaks and troughs of development activity. The inclusion of resource smoothing as a strategic element is inappropriate because it could be used as justification to develop plans which introduce large supply projects prematurely, perhaps at the expense of other demand or supply options.

  (Interministerial Review;
  response of the Ministry Industry,
  Trade and Technology)

- We feel strongly that resource smoothing, if an issue at all, should more correctly be under the purview of government. There is a definite "overcapacity" situation in hydraulic turbine manufacturing capability in Ontario at this time, and little evidence that industry could not capably and cost-effectively handle any Ontario Hydro requirements.

  (Passmore Associates)

RESOURCE PREFERENCES

Treatment in DSPS

2.4 Resource Preferences

2.4 Resources meeting the basic criteria of low cost, reliability, flexibility and quality will be preferred based on the nature of the primary energy source in the following order:

- electricity efficiency, renewable energy and waste fuels;
- plentiful fuels;
- scarce fuels.

and based on their source in the following order:

- Ontario indigenous resources and electricity efficiency;
- other Canadian resources;
- foreign resources.

- Select Committee Views:
  - should resource preferences be considered?
  - primary or secondary criteria or not at all?
  - should resource preferences be quantified?
  - other views?

Note: At present Ontario Hydro proposes to leave resource preference as a matter of judgement for each case.

(Ontario Hydro,
Presentation 112E,
Resource Preferences, L McConnell)

Submissions/Testimony

- Resource preference criteria should be primarily based on low cost, reliability, flexibility, quality and public and environmental acceptability. The source of the resources should be a secondary consideration particularly with regard to favouring indigenous Ontario sources over other Canadian sources.

(Interministerial Review;
response of the Ministry of Energy)

- Support expressed for Hydro's basic preference, but is of the opinion that the exercise of geographical resource preferences is not in the best interests of Ontario Hydro's customers and is therefore contrary to the corporate objective.

(AMPCO)

PUBLIC CONSULTATION

Treatment in DSPS

2.5 Public Consultation

2.5 **Consultation with customers, the public, governments and the legislature will continue to be an integral part of the planning process.**

Submissions/Testimony

- Participants in the public consultation process suggested that Hydro's strategy: emphasize demand management, hydraulic and small supply first; use indigenous resources; demand management be voluntary; maintain fairness in distribution of costs and benefits of demand management programmes; and provide opportunities for continued public consultation.

  (Ontario Hydro, Presentation 9,
  Public and Government Consultation, D Falconer)

- Ontario Hydro should conduct open planning workshops to facilitate full and open discussion of planning issues prior to the finalization and publication of a draft resource plan.

  (Select Committee on Energy [1986])

- The Ministry of Energy supports Ontario Hydro's efforts in the draft DSPS to treat demand-side and supply-side options on an equal basis for planning purposes. The Ministry is particularly supportive of Hydro's decision to voluntarily submit the draft DSPS to Government and public review.

  (Interministerial Review;
  response of the Ministry of Energy)

- Ontario Hydro must adopt a position of advocacy in areas of strength and advantage for Ontario. Public consultation only, without a two-way communication strategy, will cause the supply authority to react to public perception which is often based on information that is inaccurate or incomplete and frequently shaped by vested interest groups and vocal minorities. Ontario Hydro must not only consult, but it must provide balance to the public debate on electrical energy issues plus adopt a pro-active stance to provide leadership in informing and educating the public in those areas where Ontario has its greatest strengths.

  (Windsor Utilities Commission)

- Public consultation is beneficial to the planning process but it should not be allowed to cause undue delays in the decision process.

  (Municipal Electric Association)

- Ontario Hydro, when taking into account social acceptance, should consider the values and expectations of the majority rather than any particular special interest group.

  (Municipal Electric Association)

- In our view, Hydro's process of public consultation for system planning appears likely to have important shortcomings that will affect not only the credibility of the consultation but also the soundness of the plans eventually selected. The deficiencies we noted are as follows:

  - The review of both the overall strategy and specific action plans by the public, concerned parties, and government ministries and agencies is apparently to be left to Hydro to organize and conduct. It therefore lacks the appearance, and perhaps the substance, of independence and neutrality.

  - No provision is made for scrutiny of either the power plan or any action plans by independent technical experts who could provide informed comment on important technical decisions. In view of the areas in Hydro's technical analyses where we found that improvements were needed, we regard this defect with particular concern.

  - There is no established procedure for Hydro to seek, receive, and incorporate into the plans outside information and opinions (as distinct from disseminating information about the plans).

  The Panel concludes that Hydro's planning process ought to provide at specific points for reviews of decisions by independent technical experts whose approval to proceed is required.

  (Technical Advisory Panel)

- The Ministry of Municipal Affairs would like to see municipalities mentioned in the draft strategy with respect to the public consultation process in Ontario Hydro's planning activity.

  (Interministerial Review;
  response of the Ministry of Municipal Affairs)

- The Government should resolve the issue of intervener funding.

  (Select Committee on Energy, [1986])

- We are not opposed to energy projects which make use of our land and its resources. We do, however, insist that development on our traditional lands can proceed only with the full participation of aboriginal peoples and their governments at every stage and level of decision making.

  For example, Hydro did not provide OMAA or its affiliated communities with any resources with which to retain expert assistance to examine the potential effects of the proposed projects (e.g. Little Jackfish Project) on our communities. To date, therefore, there is no reliable information on how the fishing, hunting, trapping, or other resource harvesting rights of OMAA's people will be affected by the project.

  (OMAA)

- We insist that aboriginal communities and their governments should decide, in consultation with non-native governments and their agencies, how our lands will be used. We insist on participating in planning and managing any projects which may have an impact on the environment and the way of life of our people (e.g. Little Jackfish Project).

As an interim and partial alternative, the Legislature of Ontario could enact legislation requiring that any major project requiring the use of land, whether private or public, be subject to the approval of community based lands and resources management authorities. Such authorities should include democratically elected representatives of the community, representatives of the Government of Ontario and representatives from the private sector. Aboriginal peoples should be guaranteed significant representation on such authorities. The consent of the community representatives would be required for the approval of major development projects.

Aboriginal peoples should also be assured of significant participation in those agencies and boards which determine energy pricing in Ontario.

(OMAA)

- Rather than presenting and ultimately defending its choice of assumptions about discount rates, capital costs, capacity factors, life expectancy and fuel prices, Ontario Hydro should involve industry groups and consultants in an open process of investigating the cost and system impacts of various options. Such a process would not only assist in providing the most up-to-date information, as shown in other jurisdictions, it can assist in building consensus.

(Passmore Associates)

DEMAND MANAGEMENT: DEMAND REDUCING OPTIONS

Treatment in DSPS

3 Demand Management: 3.1 Demand Reducing Options

3.1 **Demand reducing options will be pursued to the full extent they are economic compared to the available supply options in the relevant planning period.**

Note: **Demand management is defined by Ontario Hydro as influencing the amount and timing of electricity use by our customers.**

Submissions/Testimony

- Ontario Hydro is committed to an energy efficient Ontario. Demand management is integral to DSPS.

  (Ontario Hydro, Presentation 111A,
  Customer Satisfaction, D MacCarthy)

- Hydro has set a target of 2000 MW for incentive-driven efficiency improvements to the year 2000 over and above the 1500 MW of natural efficiency improvements. Based on technical potential it is estimated that the residential sector will yield 45 per cent of the reduction, the commercial sector 35 per cent, and the industrial sector the balance. By 1993 it is expected that 393 MW of information-driven efficiency improvement will be achieved and 183 MW of incentive-driven efficiency improvement will be achieved.

  (Ontario Hydro,
  Presentation 113A, H Palmer)

- There is room for greater improvement in conservation targets in Ontario.

  (Wong)

- Our policy related to electricity conservation is clear. Conservation is to be not just a priority, but rather the priority in planning to meet future electricity needs. We are working with Ontario Hydro to increase the speed at which the conservation resource is captured.

  The specific roles of Government in electricity conservation are:

  - to provide a policy framework for Ontario Hydro planning;
  - to provide a regulatory framework for conservation;
  - to facilitate and co-ordinate the actions of Ontario Hydro and others who will implement major programs.

  (Ministry of Energy)

- Ontario Hydro should publish for review by the Ministry of Energy, a detailed evaluation of all strategic marketing programs including goals, objectives, costs, and benefits.

(Select Committee on Energy [1986])

- Demand management programs should continue to be optional.

(Municipal Electric Association)

- Gains which can be made through demand management programs, provided they are reasonable, should not be imposed and should take into account the diversity of Ontario's regions.

(Deep River)

- With respect to labour implications, some studies suggest that the employment potentials of demand management measures are at least as great as in a conventional demand driven system.

(Paehlke)

- Ontario Hydro must develop a comprehensive conservation strategy employing a wide range of programs to ensure that the benefits of conservation resources are distributed widely throughout the province. In its assessment of individual conservation options, Ontario Hydro must be explicitly prohibited from using the "no-losers" test as a screening tool.[1]

(Select Committee on Energy [1986])

- The Ministry of Energy welcomes the strong emphasis given to demand management in the draft strategy. Ontario Hydro's strong commitment to designing, testing and implementing programs to encourage greater efficiency of electricity use, cost-effective conservation, and the most efficient provision of the customer's requirements for electrical service is commendable.

  In the context of demand management, however, the Ministry suggests that:

  - Ontario Hydro should be cautious in evaluating demand increasing options;

[1] *The "no losers test" is defined as "a test which allows utility expenditure on a demand option up to a maximum, beyond which further expenditures would cause rates to rise above the level associated with installation of the alternative supply option." (Ontario Hydro, Draft Demand Supply Planning Strategy, Report 666 SP (December 1987), p. 13-8.) Ontario Hydro has indicated that it will not apply the "no losers test" but rather a "societal test". This latter test is less restrictive and provides that if total benefits to Ontario Hydro, the utilities and customers exceed total costs, society in total should be better off.*

- early and extensive implementation of efficiency improvement options should be a high priority, this will help to lessen uncertainty about their impact;

- certain of the demand management strategic elements, such as the financial grants criteria, could prevent the full economic potential of demand reductions from being realized; in particular, Ontario Hydro should not a priori rule out paying incentives up to full cost of the demand reduction measure for some programs; and

- the widest possible implementation of time-of-use rates should be pursued to achieve greater benefits.

(Interministerial Review;
response of the Ministry of Energy)

- While demand management was identified by Ontario Hydro as an option, more detail and emphasis needs to be placed on this option. For example, some of the elements of demand management could be made mandatory.

(Interministerial Review;
response of the Ministry of the Environment)

- The costing of demand management options appears to be subject to some question. The strategy indicates that these options are not very favourable as a means of deferring application for new generating capacity. The Ministry believes demand management options would be more desirable since they limit new construction and the use of resources thereby inducing conservation.

(Interministerial Review;
response of the Ministry of the Environment)

- Missing from the strategy is a thorough examination of the benefits of demand management options. Since demand management techniques are of importance to MITT's economic development goals, the Ministry feels it is important to acknowledge that there are other external benefits such as regional development or industrial restructuring, which should be included in the evaluation of costs and benefits of alternative options.

(Interministerial Review;
response of the Ministry of
Industry, Trade and Technology)

- Ontario Hydro adopt the policy that, where necessary to implement cost-effective conservation measures, it would pay up to the lesser of the avoided cost of new generating resources or the full cost of the conservation measures.

(Technical Advisory Panel)

- Exploring and developing demand options, admittedly a new area for Hydro, requires the application of increased financial and human resources. Expertise must be developed and acquired quickly so that programs can be expeditiously put in place to take maximum advantage of what the Panel sees as a significant potential in Ontario. There is need also to explore and develop electricity rate structures that in other countries have shown promise for promoting conservation.

(Technical Advisory Panel)

- Where it is apparent that a conservation measure will be cost-effective, Hydro should, to avoid missing the opportunity, expeditiously prepare the foundation for it.

(Technical Advisory Panel)

- This task of achieving greater job satisfaction for our employees and a more efficient organization for our customers will be undertaken in keeping with our commitment to the principles of our continuity of employment policy and collective agreements. Any redeployment process must ensure that employees have priority access to new jobs created by the increasing demand for electricity, and the stronger emphasis on customer satisfaction, energy management, environmental protection, and parallel generation.

(Franklin, Re Cresap, page 2)

- The linkages between the Energy Management Branch and the Non-utility Generation Division must be very strong in order to fully benefit from the synergism of these functions.

(CRESAP, page 5)

- Cresap endorses the repositioning and renaming of the Marketing Branch as we believe that the higher profile and Energy Management name will increase the visibility, accountability, and focus of this critical function. During the course of our reconnaissance, however, we determined that Ontario Hydro's arrangements for marketing, and the Energy Management Branch in particular, may be inefficient and that demand and supply side programs may not be consistently delivered to the customer.

  - On the basis of our experience with other utilities, staffing levels in the Branch appear high. Furthermore, marketing resources appear to be inappropriately allocated in the areas of program development and delivery. This finding has particular significance in light of the strengthened demand management mandate of the Branch and the need to better balance the supply and demand sides of the Branch's activity.

  - Linkages between the Energy Management Branch and other Branches are not as effective as they could be and lack integration in four key areas:

    - Business Planning

    - Forecasting and Planning

    - Program development/demonstration/delivery

    - Monitoring and feedback program application and effectiveness.

(CRESAP, page 7)

- Energy management activities are a cost-effective alternative to energy supply additions;

  Energy management investment activities are relatively more labour intensive than energy supply additions;

  Energy management investments generate greater domestic employment per dollar invested; and

- In our view, Hydro's process of public consultation for system planning appears likely to have important shortcomings that will affect not only the credibility of the consultation but also the soundness of the plans eventually selected. The deficiencies we noted are as follows:

  - The review of both the overall strategy and specific action plans by the public, concerned parties, and government ministries and agencies is apparently to be left to Hydro to organize and conduct. It therefore lacks the appearance, and perhaps the substance, of independence and neutrality.

  - No provision is made for scrutiny of either the power plan or any action plans by independent technical experts who could provide informed comment on important technical decisions. In view of the areas in Hydro's technical analyses where we found that improvements were needed, we regard this defect with particular concern.

  - There is no established procedure for Hydro to seek, receive, and incorporate into the plans outside information and opinions (as distinct from disseminating information about the plans).

  The Panel concludes that Hydro's planning process ought to provide at specific points for reviews of decisions by independent technical experts whose approval to proceed is required.

  (Technical Advisory Panel)

- The Ministry of Municipal Affairs would like to see municipalities mentioned in the draft strategy with respect to the public consultation process in Ontario Hydro's planning activity.

  (Interministerial Review;
  response of the Ministry of Municipal Affairs)

- The Government should resolve the issue of intervener funding.

  (Select Committee on Energy, [1986])

- We are not opposed to energy projects which make use of our land and its resources. We do, however, insist that development on our traditional lands can proceed only with the full participation of aboriginal peoples and their governments at every stage and level of decision making.

  For example, Hydro did not provide OMAA or its affiliated communities with any resources with which to retain expert assistance to examine the potential effects of the proposed projects (e.g. Little Jackfish Project) on our communities. To date, therefore, there is no reliable information on how the fishing, hunting, trapping, or other resource harvesting rights of OMAA's people will be affected by the project.

  (OMAA)

- We insist that aboriginal communities and their governments should decide, in consultation with non-native governments and their agencies, how our lands will be used. We insist on participating in planning and managing any projects which may have an impact on the environment and the way of life of our people (e.g. Little Jackfish Project).

As an interim and partial alternative, the Legislature of Ontario could enact legislation requiring that any major project requiring the use of land, whether private or public, be subject to the approval of community based lands and resources management authorities. Such authorities should include democratically elected representatives of the community, representatives of the Government of Ontario and representatives from the private sector. Aboriginal peoples should be guaranteed significant representation on such authorities. The consent of the community representatives would be required for the approval of major development projects.

Aboriginal peoples should also be assured of significant participation in those agencies and boards which determine energy pricing in Ontario.

(OMAA)

- Rather than presenting and ultimately defending its choice of assumptions about discount rates, capital costs, capacity factors, life expectancy and fuel prices, Ontario Hydro should involve industry groups and consultants in an open process of investigating the cost and system impacts of various options. Such a process would not only assist in providing the most up-to-date information, as shown in other jurisdictions, it can assist in building consensus.

(Passmore Associates)

DEMAND MANAGEMENT: DEMAND REDUCING OPTIONS

Treatment in DSPS

3 Demand Management: 3.1 Demand Reducing Options

3.1 Demand reducing options will be pursued to the full extent they are economic compared to the available supply options in the relevant planning period.

Note: Demand management is defined by Ontario Hydro as influencing the amount and timing of electricity use by our customers.

Submissions/Testimony

- Ontario Hydro is committed to an energy efficient Ontario. Demand management is integral to DSPS.

  (Ontario Hydro, Presentation 111A,
  Customer Satisfaction, D MacCarthy)

- Hydro has set a target of 2000 MW for incentive-driven efficiency improvements to the year 2000 over and above the 1500 MW of natural efficiency improvements. Based on technical potential it is estimated that the residential sector will yield 45 per cent of the reduction, the commercial sector 35 per cent, and the industrial sector the balance. By 1993 it is expected that 393 MW of information-driven efficiency improvement will be achieved and 183 MW of incentive-driven efficiency improvement will be achieved.

  (Ontario Hydro,
  Presentation 113A, H Palmer)

- There is room for greater improvement in conservation targets in Ontario.

  (Wong)

- Our policy related to electricity conservation is clear. Conservation is to be not just a priority, but rather the priority in planning to meet future electricity needs. We are working with Ontario Hydro to increase the speed at which the conservation resource is captured.

  The specific roles of Government in electricity conservation are:

  - to provide a policy framework for Ontario Hydro planning;
  - to provide a regulatory framework for conservation;
  - to facilitate and co-ordinate the actions of Ontario Hydro and others who will implement major programs.

  (Ministry of Energy)

- Ontario Hydro should publish for review by the Ministry of Energy, a detailed evaluation of all strategic marketing programs including goals, objectives, costs, and benefits.

(Select Committee on Energy [1986])

- Demand management programs should continue to be optional.

(Municipal Electric Association)

- Gains which can be made through demand management programs, provided they are reasonable, should not be imposed and should take into account the diversity of Ontario's regions.

(Deep River)

- With respect to labour implications, some studies suggest that the employment potentials of demand management measures are at least as great as in a conventional demand driven system.

(Paehlke)

- Ontario Hydro must develop a comprehensive conservation strategy employing a wide range of programs to ensure that the benefits of conservation resources are distributed widely throughout the province. In its assessment of individual conservation options, Ontario Hydro must be explicitly prohibited from using the "no-losers" test as a screening tool.[1]

(Select Committee on Energy [1986])

- The Ministry of Energy welcomes the strong emphasis given to demand management in the draft strategy. Ontario Hydro's strong commitment to designing, testing and implementing programs to encourage greater efficiency of electricity use, cost-effective conservation, and the most efficient provision of the customer's requirements for electrical service is commendable.

  In the context of demand management, however, the Ministry suggests that:

  - Ontario Hydro should be cautious in evaluating demand increasing options;

[1] *The "no losers test" is defined as "a test which allows utility expenditure on a demand option up to a maximum, beyond which further expenditures would cause rates to rise above the level associated with installation of the alternative supply option." (Ontario Hydro, Draft Demand Supply Planning Strategy, Report 666 SP (December 1987), p. 13-8.) Ontario Hydro has indicated that it will not apply the "no losers test" but rather a "societal test". This latter test is less restrictive and provides that if total benefits to Ontario Hydro, the utilities and customers exceed total costs, society in total should be better off.*

- early and extensive implementation of efficiency improvement options should be a high priority, this will help to lessen uncertainty about their impact;

- certain of the demand management strategic elements, such as the financial grants criteria, could prevent the full economic potential of demand reductions from being realized; in particular, Ontario Hydro should not a priori rule out paying incentives up to full cost of the demand reduction measure for some programs; and

- the widest possible implementation of time-of-use rates should be pursued to achieve greater benefits.

(Interministerial Review;
response of the Ministry of Energy)

- While demand management was identified by Ontario Hydro as an option, more detail and emphasis needs to be placed on this option. For example, some of the elements of demand management could be made mandatory.

(Interministerial Review;
response of the Ministry of the Environment)

- The costing of demand management options appears to be subject to some question. The strategy indicates that these options are not very favourable as a means of deferring application for new generating capacity. The Ministry believes demand management options would be more desirable since they limit new construction and the use of resources thereby inducing conservation.

(Interministerial Review;
response of the Ministry of the Environment)

- Missing from the strategy is a thorough examination of the benefits of demand management options. Since demand management techniques are of importance to MITT's economic development goals, the Ministry feels it is important to acknowledge that there are other external benefits such as regional development or industrial restructuring, which should be included in the evaluation of costs and benefits of alternative options.

(Interministerial Review;
response of the Ministry of
Industry, Trade and Technology)

- Ontario Hydro adopt the policy that, where necessary to implement cost-effective conservation measures, it would pay up to the lesser of the avoided cost of new generating resources or the full cost of the conservation measures.

(Technical Advisory Panel)

- Exploring and developing demand options, admittedly a new area for Hydro, requires the application of increased financial and human resources. Expertise must be developed and acquired quickly so that programs can be expeditiously put in place to take maximum advantage of what the Panel sees as a significant potential in Ontario. There is need also to explore and develop electricity rate structures that in other countries have shown promise for promoting conservation.

(Technical Advisory Panel)

- Where it is apparent that a conservation measure will be cost-effective, Hydro should, to avoid missing the opportunity, expeditiously prepare the foundation for it.

(Technical Advisory Panel)

- This task of achieving greater job satisfaction for our employees and a more efficient organization for our customers will be undertaken in keeping with our commitment to the principles of our continuity of employment policy and collective agreements. Any redeployment process must ensure that employees have priority access to new jobs created by the increasing demand for electricity, and the stronger emphasis on customer satisfaction, energy management, environmental protection, and parallel generation.

(Franklin, Re Cresap, page 2)

- The linkages between the Energy Management Branch and the Non-utility Generation Division must be very strong in order to fully benefit from the synergism of these functions.

(CRESAP, page 5)

- Cresap endorses the repositioning and renaming of the Marketing Branch as we believe that the higher profile and Energy Management name will increase the visibility, accountability, and focus of this critical function. During the course of our reconnaissance, however, we determined that Ontario Hydro's arrangements for marketing, and the Energy Management Branch in particular, may be inefficient and that demand and supply side programs may not be consistently delivered to the customer.

  - On the basis of our experience with other utilities, staffing levels in the Branch appear high. Furthermore, marketing resources appear to be inappropriately allocated in the areas of program development and delivery. This finding has particular significance in light of the strengthened demand management mandate of the Branch and the need to better balance the supply and demand sides of the Branch's activity.

  - Linkages between the Energy Management Branch and other Branches are not as effective as they could be and lack integration in four key areas:

    - Business Planning

    - Forecasting and Planning

    - Program development/demonstration/delivery

    - Monitoring and feedback program application and effectiveness.

(CRESAP, page 7)

- Energy management activities are a cost-effective alternative to energy supply additions;

  Energy management investment activities are relatively more labour intensive than energy supply additions;

  Energy management investments generate greater domestic employment per dollar invested; and

Contribute to industrial growth and regional expansion.

(EMR - employment impacts)

- Energy efficiency improvements/conservation along with acid rain controls can together reduce acid rain.

(Geller)

- Demand management has the shortest time between the period when dollars are spent and when benefits show to the system. However, it is apparent that to obtain a large contribution to the electricity system the time required is approximately equivalent to the period needed to plan and construct a large generating station. Programs would have to be developed and be in place well before they are needed so that they could be adjusted or altered if the desired level of participation does not take place.

(Municipal Electric Association)

- Lighting, one of the largest electricity loads in Ontario, offers some of the largest electricity savings now available. As an example, lighting represents more than 35 percent of Ontario's total industrial and commercial building electricity consumption.

(Peden)

- Force Ontario [Hydro] to actively pursue energy conservation as a means of supplying electricity . . . a megawatt saved is a megawatt freed to be used elsewhere. Hydro needs firm targets for reducing electricity use.

(Hunter)

- With regard to the options presented, we are most pleased that the option of demand management is given such prominence and priority. While we support fully that the objective must be to meet customer requirements on demand, it does not follow that the customer should be profligate in that demand, particularly when the meeting of extravagant demand has such economic and environmental impact.

(UNISYS)

- R-2000 houses are marketable, especially when the non-energy benefits are emphasized. R-2000 houses offer superior air quality and freshness, unprecedented levels of comfort resulting from efficient heating and well insulated shell, quiet interiors, and the ability to control dust, pollen and other allergy creating particles in the home. These benefits, when paired with heating bills that are usually half that of comparably sized conventional housing, can be powerful selling tools.

(Ontario Home Builders' Association)

- There are 10,000 ground source heat pump systems currently operational in Canada, approximately 75 percent of which are located in Ontario and 40 percent of which will have been installed in 1988.

  However, a typical ground source heat pump installation costs 20% more than a conventional system (i.e., in an average home $2,000 more). The main drawback is, as noted in the Report of the Electricity Planning Technical Advisory Panel to the Minister of Energy, that 70 percent of the purchase decisions made on heating the cooling appliances are not made by those who pay for the energy consumption. The speculative homebuilder will, of course, install

the cheaper system. This is the case, notwithstanding the fact that the energy savings generally allow for a payback of the additional capital cost of installation in less than three years. Public awareness of the technology has not yet reached levels where the consumer demands efficient home comfort appliances from a tract developer.

(Canadian Earth Energy Association)

- Concern expressed regarding "reliability" of demand options.

(AMPCO: Presentation)

- Energy Service Companies, which finance industrial and commercial energy conservation programs from the energy savings realized, are now active in Ontario as well as throughout North America. The concept of energy conservation and demand reduction being delivered through conventional and performance contractors is receiving wide attention throughout New England and elsewhere.

(Econoler, Inc.)

Achievement of Demand Management Targets

- Ontario Hydro also prepared, at the request of the Minister of Energy, a Plan for Electricity Conservation and Efficiency Measures. The plan confirms that Hydro's target for strategic or incentive-driven conservation by the year 2000 has been raised from 1000 MW to 2000 MW and that efficiency improving activities have been moved forward by up to two years from previous plans. The Minister has, however, expressed disappointment that under this plan Hydro's estimate of total electricity conservation likely to be achieved through both Hydro programs and by consumers on their own is little changed.

(Ministry of Energy)

- We would caution Ontario Hydro and the Committee against unrealistic expectations from the various options within this strategy. The risks involved in these options not meeting expectations in terms of costs, timing and load growth deferral should be assessed as part of the overall strategy.

(Consulting Engineers of Ontario)

- It is a difficult process and it takes strong leadership from something like the Northwest Power Planning Council and/or the utilities in order to be able to place before the lawmakers the public policy choices of either making building more efficient, which builders and homeowners generally do not like because of the increased first cost, in exchange for the development of new generating resources that are going to be far more expensive.

(Litchfield)

- The very first impression of the Draft Demand/Supply Planning Strategy is that the document presents, perhaps, an overestimated exaggeration of the expectations which Ontario Hydro is hoping to achieve in the way of megawatts savings from various demand options.

(Etobicoke Hydro)

- Due to the requirement to develop voluntary demand management programs, it is possible that the desired penetration levels may not be obtained . There is a great deal of uncertainty with respect to the amount demand management will contribute to the system requirements. Information is required regarding the extent of customer acceptance which can be expected from various programs and the amount customers can be motivated to conserve through promotion efforts. Demand management contributions may also be unreliable. Once customers implement conservation measures, lower electricity bills often bring about less concern about controlling use and consumption may rise, thereby making demand management program contributions unpredictable. Reducing the uncertainty of the expected contribution of demand management programs could allow some deferral of the need to plan for new supply facilities.

  (Municipal Electric Association)

- Demand management market demonstrations should be increased and accelerated in order to reduce the uncertainty associated with the potential contribution of these programs.

  (Municipal Electric Association)

- Demand management may make a significant contribution to meeting the demand requirements. If the program is relatively successful it will delay the need for more generation until the turn of the century if demand grows as forecasted.

  On the other hand, if the program is only marginally successful and demand continues to grow at its present higher than forecasted rate, significant new generation will be required by the mid 1990s. A contingency plan should be made in case the programs are not able to control the demand growth.

  (Municipal Electric Association)

- Beyond the identified demand management potential major supply additions should already have been committed.

  (Joint Industry Task Force)

- There is an urgent need to initiate all cost effective demand management programs as expeditiously as possible.

  (Joint Industry Task Force)

- We are confident of our ability to shave 1,700 MW off peak by 1995. Hydro is not yet confident in either the technology or its benefits to load management. Therefore I submit it is essential that a task force be struck within the utility to immediately examine claims made by the ground source heat pump and its supporters and if they are found true to recommend methods of supporting and promoting the industry.

  (Canadian Earth Energy Association)

- We fully support both conservation and the development of a major program by Hydro to assist customers in identifying potential situations where efficiency of electricity use can be achieved as goals. The principal incentive should be the energy cost saved. Incentives from Hydro should be limited to the difference between the cost of incremental capacity less the average cost of current generation.

  (FESA)

- We are not convinced that demand strategies at the present favourable electricity rates in Ontario will have adequate impact to defer construction of future generating facilities that are not yet planned, let alone approved. Unavailability of a reliable electric supply today can become extremely critical in modern industry with so much advanced technology and robotics.

  (Windsor Utilities Commission)

- The impact on demand from demand management concepts contained in DSPS are too optimistic, particularly in the short-term. We suggest significant effects from this strategy component will be lower than anticipated during the 1990s and should be discounted until some results are evident.

  (Chalk River Technicians)

- Although efficient demand management is a necessary component of an electrical energy strategy the situation of not being able to meet demand must be avoided by the timely provision of an assured electrical supply. Of the supply options available, nuclear energy can provide the most cost effective long term means of providing the required electrical supply.

  (Canadian Nuclear Society)

- Canadian utilities, particularly Ontario Hydro, are reluctant to proceed with demand-side programs. Ontario Hydro's lack of experience with demand-side planning techniques and its lack of understanding regarding conservation direct them to treat demand-side planning as a risky area. The uncertainty surrounding the implementation of demand-side options in most utilities particularly Canadian utilities can be largely eliminated by the use of demonstration projects and pilot tests. Experience in the U.S. indicates that while uncertainty will always remain, data gathering and direct program experience can narrow the utility's range of uncertainty significantly.

  (University of Windsor, Faculty of Engineering)

DEMAND MANAGEMENT: LOAD SHIFTING OPTIONS

Treatment in DSPS

3.2 Load Shifting Options

3.2.1 Demand management programs aimed at shifting demand from peak to off-peak times will be selected to respect system limits on the usefulness of load shifting.

3.2.2 The choice between load shifting and energy storage will reflect the costs and benefits of each option.

Submissions/Testimony

- The target for load shifting is 1000 average MW (averaged over the 16 hour peak period) by the year 2000; 1000 MW is as much as the system can accept since Ontario Hydro has a high daily load factor of 87 percent during its winter peak. Shifting will be in response to time-of-use rates, direct control and storage technologies. By 1993, 580 MW of load shifting can be achieved. In addition energy storage options are expensive and of limited potential and are not being pursued at this time.

  (Ontario Hydro,
  Presentation 113B,
  H Palmer and L McConnell;
  Final Presentation)

- This is supported as probably the most economic (after additional peaking hydraulic) of options for load-levelling. However, the potential benefit of 1000MW claimed is speculative and may not be realized in practice.

  (FESA)

- With respect to load shifting it is noted that the current Hydro load curve provides a limited potential for large scale energy storage.

  (Consulting Engineers of Ontario)

- Ontario Hydro believes that load shifting is a viable option that can "save" at least 1000 MW by the year 2000. This 12 year lead time is consistent with a long time frame to educate customers and to possess a greater understanding of load growth and economic growth. In terms of shifting load to off-peak periods, undoubtedly some savings can result. Our own estimation is that 1000 MW is on the high side and that a more realistic projection would be in the range of 500 to 700 MW saved.

  (Etobicoke Hydro)

DEMAND MANAGEMENT: DEMAND INCREASING OPTIONS

Treatment in DSPS

3.3 Demand Increasing Options

3.3 **Demand programs aimed at increasing demand will be pursued where they provide benefits to customers in total.**

Submissions/Testimony

- Introduction of new energy efficient electrotechnologies will offset gains from demand management.

  (Joint Industry Task Force)

- Substituting electricity for less efficient fossil fuels can make good environmental sense and contributes to greater economic prosperity. Many of the advanced process technologies vital to Canada's competitive future are electricity driven.

  (Canadian Electrical Association)

DEMAND MANAGEMENT: MUNICIPAL UTILITIES

Treatment in DSPS

3.4 Cooperation with Municipal Utilities

3.4 The planning and implementation of demand management options will be undertaken in close cooperation with the municipal utilities.

Submissions/Testimony

- Markham Hydro is convinced that there are many opportunities to improve energy efficiency in Ontario. Markham Hydro is also convinced and has demonstrated that demand side initiatives properly presented and explained to the consumer will be accepted if they are cost effective.

  As a municipal utility which knows and understands its consumers, we are anxious to work with other interested parties in furthering demand side options and recommend that incentives be made available to individual utilities for "buying in" to such programs.

  (Markham Hydro Electric Commission)

- Ontario Hydro should work with municipal utilities to develop rates based on long-run marginal costs, thereby encouraging appropriate levels of conservation.

  (Technical Advisory Panel)

- The interests of Ontario Hydro and those of the municipal utilities are not necessarily congruent, especially with respect to interruptable load. Cooperation between Ontario Hydro and municipal utilities may be easier said than done in a situation where each entity has valid interests to defend.

  (AMPCO)

- Municipal utilities should maintain their right to implement demand management programs that best serve their customer needs.

  (Municipal Electric Association)

- An issue for future consideration is the preparation of demand management targets for municipal utilities.

  (Committee discussion)

- With respect to demand management, the draft strategy is not clear about the role and the treatment of municipal utilities. In particular, the Ministry of Municipal Affairs raises the question of whether municipal utilities will be treated the same as other customers of Ontario Hydro and be eligible for the same financial incentives.

  (Interministerial Review;
  response of the Ministry of Municipal Affairs)

- Within municipal utilities there is a need for a more aggressive marketing approach to energy efficiency and also to increase the market share of electricity.

(Discussion of Etobicoke Hydro presentation)

- Agreement expressed regarding the draft demand/supply planning strategy. Support and encouragement expressed for demand side initiatives as a means of improving electrical efficiency. Markham Hydro is anxious and capable of playing an expanded role in this important strategy in the electrical future of the province.

(Markham Hydro Electric Commission)

- The Draft Demand/Supply Strategy states unequivocally that the demand option side requires fundamental cooperation from all of Ontario's municipal utilities. While our utility possesses a highly competent marketing, engineering and meter reading staff, our resources are sometimes stretched to the limit in terms of responding to all of our customer enquiries in an in-depth manner.

  Given that a recent management consultant carefully reviewed some of Ontario Hydro's operation and found that Ontario Hydro's overall management levels are somewhat over-staffed and given that the Draft Demand/Supply Planning Strategy specifies that, in order for the municipal utilities to be strong participants in any proposed implementation of demand options, it is particularly important that sufficient levels of staff expertise in the demand options side must be made readily available to the medium and smaller size utilities.

  Therefore, we would recommend that a large number of Ontario Hydro staff with expertise in demand options be seconded to those utilities that currently lack the staffing expertise to implement the demand initiatives as set out in the Draft Strategy. Without this secondment of staff to these utilities, we believe that Ontario Hydro will be unable to realize the large number of goals that Hydro has established for the proposed demand options. The secondment of staff is essential because Ontario Hydro has itself pointed out demand initiatives will take between 10 to 15 years for full realization of the megawatt savings.

(Etobicoke Hydro)

DEMAND MANAGEMENT: TIMING

Treatment in DSPS

3.5 Timing of Demand Management

3.5.1 Development and implementation of economic demand reduction programs should be started early enough to be effective in contributing to the most cost effective demand/supply balance.

3.5.2 Priority should be given to influencing the new market rather than the retrofit.

Submissions/Testimony

These issues are touched upon by witnesses in other Demand Management sections of this report.

DEMAND MANAGEMENT: RESEARCH AND DEVELOPMENT

Treatment in DSPS

3.6 Demand Management - Research and Development

3.6.1 Technical research and market development to support existing and planned demand management programs will be given a high priority so that demand options can be efficiently implemented in a timely manner.

3.6.2 To provide flexibility, technical research and market demonstration programs shall be undertaken to provide information on the potential for new demand management programs.

Submissions/Testimony

- Consideration should be given to the fact that energy efficient equipment (e.g. light fixtures) may have to be replaced during the 40 year time frame equivalent to the service life of a supply option. Incentive programs might have to take this into account.

  (Committee Discussion re Ontario Hydro,
  Presentation 113F,
  Demand Management, R & D, H Palmer)

- Demand management market demonstrations should be increased and accelerated in order to reduce the uncertainty associated with these programs.

  (Municipal Electric Association)

- The Government should direct Ontario Hydro to initiate, as part of its resource plan, three large scale technical and market demonstration programs for conservation, up to $25 million each, in each sector (residential, commercial and industrial).

  (Select Committee on Energy, [1986])

- Ontario Hydro should establish a special Task Force for each of the residential, commercial and industrial sectors for the explicit purpose of participating in the development and on-going monitoring of a conservation strategy for that sector.

  (Select Committee on Energy, [1986])

- Ontario Hydro should extend its assessment of conservation opportunities in Ontario and develop a complete set of conservation supply functions for incorporation in the planning process.

  (Technical Advisory Panel)

- Ontario Hydro should develop a monitoring and post-audit system to determine the amounts of demand option alternatives realized.

  (AMPCO)

- Ontario Hydro describe and explicitly explain the interaction between conservation measures and load forecasts.

(Technical Advisory Panel)

- Ontario Hydro should endeavour to more accurately define what may be achieved through conservation.

(INCO)

- Concern was expressed that there is the matter of uncertainty of the timing and magnitude of demand options compared to supply options, where the risks of forced outages and late in-service dates can be measured and predicted with a fair degree of confidence. The equivalence of demand options which are to be substituted for supply options needs to be established in a credible manner.

(AMPCO)

DEMAND MANAGEMENT: PROMOTION & EDUCATION

Treatment in DSPS

3.7 Demand Management - Promotion & Education

3.7 Education, information dissemination, audits and advertising will be pursued to make customers aware of the opportunities for the efficient and effective use of electricity.

Submissions/Testimony

- Ontario Hydro cannot do demand management alone - such programs may involve the participation of the Ministry of Energy, municipal utilities, consumers and the private sector.

  (Ontario Hydro,
  Discussion of Presentation 113H,
  Promotion and Education, D Comissiong)

- As a means of getting the message out about demand initiatives, Ontario Hydro must work unstintingly to promote specific demand options for many years because the public expectation is that hydro supply is limitless even though that same public has placed substantial restraints on the production of that hydro supply. Ontario Hydro must work very closely with the utilities to spread the word clearly and consistently through a variety of communication vehicles.

  (Etobicoke Hydro)

- There is one over-riding objective: to ensure the lasting impact of the technical developments and research obtained by the R-2000 Program. This objective, which is sometimes referred to as institutionalization, has resulted in our pursuing a series of activities which include: ensuring that R-2000 training becomes included in community college training programs; ensuring that the marketing of energy-efficient technology remains a priority in the eyes of builders and industry co-sponsors; and ensuring that codes and standards developments keep pace with technical innovations.

  (Ontario Home Builders' Association)

- Very few additional freezers are sold due to concerns regarding their energy efficiency. High-efficiency freezers are selected because of the higher overall quality of manufacture required to make them energy-efficient.

  (W C Woods Ltd.)

- Energy conservation is at the bottom of consumer choice factors based on sales experience . . . The consumer is confused by labelling and foreign standards.

  (W C Woods Ltd.)

DEMAND MANAGEMENT: RATE INDUCED

Treatment in DSPS

3.8 Rate Induced Demand Management

3.8.1 General rates will be based on average costs.

3.8.2 Rates may be time differentiated to give incentives to shift load to off-peak periods.

3.8.3 Special rates for non-standard conditions of service may be implemented to manage demand for specific purposes.

3.8.4 Special rates should recover at least the additional cost of supplying the electricity sold under these rates.

Submissions/Testimony

- Hydro has adopted four rate-making objectives: rates should recover the annual revenue requirement; rates should be fair; rates should encourage the efficient use of electricity; and rates should be publicly acceptable.

  (Ontario Hydro,
  Presentation 113I,
  Rate Induced Demand Management, B Conway)

- These measures will result in the more efficient use of Hydro's system and help defer the need for new capacity; the target is for 1000 MW by the year 2000.

  (Ontario Hydro,
  Presentation 113I,
  Rate Induced Demand Management, B Conway)

- Ontario Hydro's 1988 target for incentive-driven electrical efficiency is a 6.4 percent reduction for the year 2000. The 1988 Draft Plan for the Northwest U.S. has specified a target reduction from conservation to 7 percent for the year 2010. It is maintained that "both programs are in the same ballpark."

  (Ontario Hydro, Final Presentation,
  L McConnell)

- Special rates should be required to cover all costs caused by supplying the additional electricity sold under these rates.

  (Municipal Electric Association)

- The Municipal Electric Association membership is dedicated to maintaining the power-at-cost concept. Designing rate structures to attain particular social objectives should not be allowed and Hydro should not be used as an instrument of social policy. Economic development programs subsidized by Hydro would invariably lead to increased costs. It is unfair to expect ratepayers to subsidize these programs. Social programs should continue to be directly administered and funded by government.

  (Municipal Electric Association)

- Costs should continue to be based on cost causality to the extent feasible and practical. Increasing the price of electricity solely to reduce demand would have a considerable negative impact on the provincial economy and would be against the principle of customer satisfaction.

  (Municipal Electric Association)

- Rates should continue to be based on cost and not used as a tool to limit demand growth.

  (Municipal Electric Association)

- The statement that general rates will be based on average costs is welcome, if it is meant as an alternative to basing rates on the replacement costs of the existing system. Average costs move slowly and contribute to rate stability.

  (AMPCO)

- A strong program of conservation, with financial incentives and rates structured to encourage conservation, could forestall the need for more nuclear reactors.

  (Hansens)

- Price induced conservation scenarios, e.g., 50 percent real rate increase necessary to choke demand, could have been studied.

  (Connor-Lajambe)

DEMAND MANAGEMENT: FINANCIAL INCENTIVES

Treatment in DSPS

3.9 Financial Incentives for Demand Management

3.9.1 Incentives should be high enough to encourage the development of a large part of the potential that is beneficial to customers in total.

3.9.2 Customers who participate and receive direct benefits should provide a substantial contribution to the cost.

3.9.3 The level of incentives should be acceptable to customers in general.

3.9.4 Financial incentives should be based on lifetime benefits; loans and grants may be used to increase the return to customers in early years.

Submissions/Testimony

- Guidelines for designing incentives should involve: monitoring of results, sunset clauses - availability for limited time only, use of existing infrastructure, i.e., suppliers, distributors, and broad coverage.

  (Ontario Hydro,
  Presentation 113J,
  Financial Incentives for Demand Management,
  D Comissiong)

- Ontario Hydro develop, for each major end use in the Ontario economy, a comprehensive assessment of the expected costs of all potentially cost-effective conservation measures.

  (Technical Advisory Panel)

- We have no basic conceptual problems with principles 1, 3 and 4, although they require substantial interpretation (i.e., 3.9.1, 3.9.3 and 3.9.4), may be difficult to apply, and at times may conflict. However, we disagree with principle 2 (i.e., 3.9.2).

  If a conservation measure is as effective at reducing demand as a new resource option would be at increasing capacity, we see no reason why Hydro should not be prepared to pay full price for it.

  (Technical Advisory Panel)

- The only incentives Ontario Hydro should offer are those that will reduce the rates for all, and those incentives should be offered to all customers. Any other incentives should be determined by Government policy and offered through the appropriate Government agency.

  (Ontario Mining Association)

- There should be some emphasis given to the requirement that financial incentives be cost-effective.

  (Consulting Engineers of Ontario)

- Though barriers exist to the adoption of conservation, Hydro could probably implement most cost-effective conservation measures for less than the full marginal cost of new generation. But in order to achieve high penetration rates in each sector it will probably be necessary for Hydro to offer financial assistance at levels up to the total cost of each conservation measure.

(Technical Advisory Panel)

- Financial incentives, if properly administered and applied equitably, can play a highly significant role in terms of customer response for demand reducing initiatives. The principal of neutrality with respect to customer preference must be scrupulously adhered to. When an organization develops an incentive program, customer preference cannot be shown on an individual basis or through a class preference if the incentive program can be structured to avoid that preference.

(Etobicoke Hydro)

- In determining the appropriateness of specific demand management programs, it should be required that expenditures on each program will result in a net benefit to the system. The cost of these programs should be considered part of the normal operating cost of the supply authorities and this cost should be recovered through the rates. To avoid inequitable cross-subsidizations, it is important to develop a sufficient number and variety of demand management programs to ensure that all customers will have the opportunity to participate and share in the benefits.

(Municipal Electric Association)

- Utility demand-side management in the U.S. is widespread and growing and has consisted of: utility incentive programs (i.e., rebates and subsidized loans) to stimulate efficiency improvement); direct installation of conservation measures; "demand-side bidding," where owners of buildings propose particular electricity conservation projects; least-cost utility planning, where services are provided at the lowest possible cost; and minimum appliance efficiency standards.

(Geller)

DEMAND MANAGEMENT: ENERGY EFFICIENCY STANDARDS

Treatment in DSPS

3.10 Energy Efficiency Standards

3.10 Ontario Hydro will work with governments, industry and customers towards developing standards for buildings, appliances, etc., including the highest electrical energy efficiencies that are widely acceptable.

Submissions/Testimony

- This government is committed to a more energy-efficient Ontario.

(Wong)

- Ontario Hydro support expressed for the Energy Efficiency Act. Long appliance life and slow replacement standards will contribute 100 MW to load reduction by 2000.

(Ontario Hydro,
Presentation 113K,
Energy Efficiency Standards, D Comissiong)

- The Ministry of Energy should investigate the feasibility and desirability of provincial action in the development and implementation of labelling programs and efficiency standards to encourage the production and use of high efficiency appliances. The Ministry should develop a plan to encourage the construction of more efficient buildings using incentives and/or strengthening the existing building code.

(Select Committee on Energy [1986])

- Ontario Hydro develop and recommend to government energy efficiency standards for all measures that are cost-effective based on the marginal cost of new resources.

(Technical Advisory Panel)

- Ontario Hydro believes that energy efficiency standards should be adopted but projects that it will receive only 100 MW from the "consensus" standards by the year 2000. Based on California experience, this is an overly pessimistic goal which suggests that either 1) the standards will be delayed and not come into effect quickly; or 2) the standards will not be adequately stringent to conserve significant amounts of energy because the "consensus" approach recommended by Hydro will give too much weight to the concerns of appliance manufacturers and home builders relative to electric consumers, or both.

(Marcus: Report)

- While the draft strategy indicates that Ontario Hydro is prepared to work with the government, industry and customers in developing conservation standards for buildings, the Ministry of Housing is not in favour of strengthening the energy conservation standards currently in the Ontario Building Code. The Ministry believes that significant improvements can be made to the energy sufficiency of the average new house without the imposition of additional prescriptive measures that ultimately result in higher house prices. The Ministry has undertaken to ensure that its major streamlining and consolidation

of the building code does not inhibit the adoption of new energy-efficient technologies and practices. The Ministry is also prepared to assist in the development of efficiency guidelines for the construction industry, as well as a "labelling" system for new housing which would inform the home buyers of the electricity-saving features used in a given house's construction.

(Interministerial Review;
response of the Ministry of Housing)

- Removing barriers to energy-efficient appliances and heating/cooling equipment could be facilitated by tough minimum performance standards (under the new Energy Efficiency Act) and through incentives (rebates) for high efficiency models.

(Marbek/Torrie)

- U.S. energy efficiency standards for appliances are adequate. They can potentially be raised in the future and there is a provision in the American legislation for automatic review and possible increases of the minimum efficiency or consumption standards. The legislation was supported by manufacturers who feared widely varying state regulations that would balkanize their marketplace.

(Marbek/Torrie)

- It is clear that energy efficiency is the cheapest when built in from the start.

(Peden)

- A separate testing organization from the Canadian Standards Association should be established for energy efficiency performance evaluations. It should be self-funding and independent.

(W C Woods Ltd.)

- To win the war against energy inefficiency we need allies. For this reason, adopting minimum energy efficiency requirements for appliances which are comparable to U.S. standards would be preferable to attempting to gain a few percent gains here by unique regulations. Canadian manufacturers need access to the U.S. market and would be harmed by different provincial and national standards.

(W C Woods Ltd.)

DEMAND MANAGEMENT: OTHER BARRIERS

Treatment in DSPS

3.11 Other Barriers

3.11 Ontario Hydro will identify other barriers to increased efficiency and work with other parties as appropriate towards the reduction or elimination of such barriers.

Submissions/Testimony

- One specific barrier is that the Power Corporation Act does not specifically allow the payment of cash incentives to customers.

  (Ontario Hydro,
  Presentation 113L,
  Other Barriers, D Comissiong)

- Ontario Hydro and the Ontario government together ensure that conservation programs are specifically designed to reach users who might otherwise not participate in them.

  (Technical Advisory Panel)

- In the part of the strategy dealing with demand management, the Ministry of Housing supports attempts to encourage responsible electricity consumption. In bulk metered apartments, there is no obvious way to make tenants accountable for their individual electricity consumption. The draft strategy suggests that tenants could be encouraged to conserve through a benefit sharing plan. The Ministry of Housing doubts that this proposal will provide a workable remedy. An additional impediment to energy efficiency in bulk metered apartments is the lack of incentive for the landlord to introduce conservation measures, since any gains can be neutralized by irresponsible consumption of some tenants. In such cases, the feasibility of promoting measures, like high efficiency lighting and appliances and energy-efficient hot water systems, where savings accrue to the landlord regardless of a tenant's behaviour, should be examined closely by Ontario Hydro. In individually metered apartments, landlords are often unwilling to invest in measures where the benefits accrue only to the tenant. In such cases, the Ministry suggests that Ontario Hydro offer financial incentives to introduce conservation measures, with some of the landlord's capital costs being recovered through the present Rent Review process.

  (Interministerial Review;
  response of the Ministry of Housing)

- One of the major barriers to achieving enhanced efficiency involves the payback periods required to trigger customer investment. Utility programs must respond to the short one to three year payback expectations generally required by customers.

  There is a role for government to find ways through the fiscal regime to encourage longer-term investment in energy saving projects. Accelerated capital cost write-offs or tax credits could be helpful to both industry and homeowners in stimulating positive investment decisions.

Industry, government and utilities will have to approach energy efficiency as partners if substantial progress is to be made beyond the early and obvious gains that can be obtained. Once the most accessible efficiency opportunities have been exploited, subsequent increments of improvement become disproportionately expensive. At a certain point, a crossover occurs where it is more efficient economically for utilities to provide additional supply, rather than to develop the remaining demand efficiency opportunities.

(Canadian Electrical Association)

- A sufficient number and variety of demand management programs should be developed to ensure that all customers will have the opportunity to participate and share in the benefits these programs provide to the system.

(Municipal Electric Association)

- A notable barrier may be the availability of energy efficient products in the stores.

(Peden)

- Payback period dominates as the chief economic barrier. Using conventional economics, many energy-efficient technologies require more than the two or three year payback generally stipulated for capital investment by industry.

(Peden)

- It is our observation that any conservation saving with R-2000 could be lost if Hydro increased market share against these less expensive forms of heat energy. It is therefore important that this Committee recommend the promotion of R-2000 house construction rather than the promotion of the "All-Electric" R-2000 house. This is a significant, albeit secondary point.

(Ontario Home Builders' Association)

INDEPENDENT, PARALLEL OR NON-UTILITY GENERATION

Treatment in DSPS

4 Independent Generation

4.1 **Rates for purchasing power from independent generators and incentives for independent generation projects shall be up to the avoided cost to the system as a whole.**

4.2 **Rates and incentives for independent generation may vary because avoided cost depends on many factors, including the reliability, timing and location of the deliveries.**

4.3 **Ontario Hydro will regularly communicate the need for independent generation to potential independent generators; request proposals to contribute to that need; and negotiate detailed terms and conditions with suppliers whose proposals have potential to satisfactorily meet the need.**

4.4 **Ontario Hydro will establish standard rates for purchases of independent generation having a capacity of five MW or less. The standard rates for hydroelectric or other renewable sources will be set at the full avoided cost.**

Note: Avoided cost is the cost that Ontario Hydro would have incurred to provide the same level of service as that of the independent generator. Avoided cost will vary with location, timing of delivery, reliability, ability of Ontario Hydro to dispatch or schedule independent output, and degree to which in-service date is close to system need date.

(Ontario Hydro,
Presentation 114A,
Independent Generation - Planning Principles,
K Snelson)

Submissions/Testimony

- A bidding system for small private generators up to Ontario Hydro's avoided marginal cost could be considered.

(Franklin)

- For 1989, Ontario Hydro is considering a competitive bidding process for projects above 5 MW. The key issue will be what is economic. Hydro will likely specify a block of capacity to be met by the private sector. Eventually this block could constitute the utility's full supply requirements. A longer-term approach might even be taken for the private sector to become involved in bidding to meet the utility's power requirements.

(Ontario Hydro,
Presentation 114B and discussion,
Non-utility generation, H Palmer)

- With the recent establishment of a non-utility generation division, the target for private generation has been increased from 330 MW to 1000 MW by 2000.

(Ontario Hydro,
Presentation 8B,
Non-utility generation, H Palmer)

- For installations of 5 MW and less rates are preset with some options, and in some cases these prices are above Ontario Hydro's avoided costs. For installations above 5 MW rates and conditions are negotiated with the ceiling of Ontario Hydro's avoided costs, with provision to buy up to full avoided cost. A bidding system is also under consideration due to volume of proposals.

(Ontario Hydro,
Presentation 8B,
Options Non-utility Generation, H Palmer)

- It was admitted, however, that in some instances transmission system limitations, e.g., in northwestern Ontario, limit the capacity to absorb new generation.

(Ontario Hydro,
Presentation 114B,
Non-utility Generation, H Palmer)

- Estimated potential by the year 2000 for four categories of private generation: small hydro, 200-400 MW; municipal solid waste, 150 MW; wood wastes, 50 MW; cogeneration, 700-1000 MW.

(Ontario Hydro,
Presentation 114B,
Non-utility generation, H Palmer)

- By the year 2000, depending on the choice of investment criteria, 1300-1700 MW of cogeneration capacity are financially feasible in the industrial and buildings sectors. These amounts are highly sensitive to buy-back rates.

(Diener)

- In addition to conservation, independent generation does well when judged against the three basic criteria of security, reasonable cost and environmental compatibility. This option offers diversity and increases planning flexibility. Independent generation also encourages the more efficient use of indigenous resources, fosters the development of a new industry in Ontario and can offer power where it is needed with short lead times. The Ministry has a long-standing policy of actively supporting small hydro and other forms of independent generation.

(Ministry of Energy)

- As a recommendation for the Committee, I would suggest that a Committee recommendation would be to take, for example, 50 percent of new generation and establish a policy that this be provided through the private sector. I think this would be a challenge to industry. It would take some of the pressure off Ontario Hydro and would be a beneficial policy for the province.

(Bechtel)

- The current standard buy-back rates for suppliers of 5 MW or less are somewhat higher than the calculated avoided costs. That comes about in the following way. Our calculations in 1986 for avoided costs for the report to the Minister showed the rates then used were above the avoided costs. We elected to stay with the earlier rate form because our studies showed avoided cost-based rates would overtake it by 1990-1991. A reduction in the buy-back rates at a critical time in the development of parallel generation seemed to be counterproductive.

For larger projects, nominally those over 5 MW capacity, Hydro's approach is to treat each project individually. Power purchase rates and incentives such as low interest loans are negotiated. The combined value to the generator of rates and incentives is limited by Hydro's avoided costs, i.e., the costs Hydro avoided by a specific projects's coming on to the Hydro system.

(Ontario Hydro,
Presentation 114B,
Non-utility Generation, H Palmer)

- The Ministry of Energy welcomes the strong emphasis given to independent generation. The Ministry believes that rates paid to independent generators should fully reflect the value of the power to the system and should not differentiate between different sources of generation.

(Interministerial Review;
response of the Ministry of Energy)

- The Ministry of Northern Development and Mines welcomes the strategy's support for independent generation. This should encourage the development of small hydro as well as cogeneration which add to the resiliency of the overall system and facilitate entrepreneurship. While supporting the principle that Ontario Hydro pay the full avoided cost for purchased power, other options include: making it compulsory for Ontario Hydro to "wheel" power between independent generators and communities or industrial customers; and standard and generous buy-back rates for small producers. Hydro should also be required to exercise its right of first refusal on hydro sites within a reasonable amount of time or release such sites to private development.

(Interministerial Review;
response of the Ministry of
Northern Development and Mines)

- Encouraging parallel generation through full avoided cost prices and standard contracts is important not only to bring resources on line but to acquire information and experience.

(Marcus: Testimony)

- Cogeneration, and other forms of parallel generation like small hydraulic, can reduce and/or defer public capital expenditures for new generating capacity. It allows for increased resource planning; helps to improve efficiency of transmission line use; helps to diversify supply; and adds to system reliability.

(Peden)

- Gas cogeneration is a good option, but again, when you are committing these enormous gas supplies to the production of electric power, ultimately that is going to affect the amount available for domestic consumption. It is definitely going to affect the pricing. That may be five years off, but five years is the time frame for building a new power plant.

(Bechtel)

- The Ministry of Housing supports Ontario Hydro's independent generation options, especially when such options have the potential for contributing to economic decentralization. This would have the effect of reducing the migration of the labour force from rural areas to large urban centres thereby easing the pressure on the urban housing market.

(Interministerial Review;
response of the Ministry of Housing)

- The Minister of Energy should request the Ontario Energy Board to hold a public hearing to determine the price which best reflects the value of parallel generation to the system, and to determine the desirable amount of parallel generation that could be added to the system within the current planning horizon.

(Select Committee on Energy [1986])

- The Ministry of Energy should develop and publish detailed plans for parallel generation options including:

  - specific targets;
  - financial and contractual arrangements;
  - the role of Ontario Hydro in promoting parallel generation;
  - additional research, development and demonstration programs needed; and
  - information and marketing efforts.

  The Government must direct Ontario Hydro to incorporate these plans into its own annual resource plan.

(Select Committee on Energy [1986])

- Based on experience in other jurisdictions, we believe Hydro's approach to independent generators is set out too narrowly and specifically. Hydro has indicated as a strategic principle that it will restrict standard contracts to independent generators under 5 MW. A less restrictive independent power policy would in our view reveal much greater potential for independent generation as an alternative supply option. We focus on this area not only because of its potential importance but also because we recognize that Hydro has limited experience with its possibilities.

(Technical Advisory Panel)

- In our view it would be more effective in the short term to set a standard price and contract with clear stipulations, and then let the private sector see what can be done to meet the conditions. Hydro currently has set standard buy-back rates for producers under 5 MW. Standard rates and contracts should be established for all producers. The contract and pricing terms should be given policy review by government and independent regulatory review rather than being set unilaterally by Hydro as is done at present. The prices should be provided for a specific amount of power and updated for new producers when that amount of power has been committed. If, as has occurred in other jurisdictions, a large number of potential producers come forward for the initial offer, Hydro could reconsider the potential for independent power production. As an independent generation industry begins to develop, a bidding mechanism could be instituted to recover the benefits from competition for ratepayers and society as a whole.

(Technical Advisory Panel)

- Ontario Hydro would not welcome an independent binding arbitration process to establish avoided costs.

(Ontario Hydro,
L McConnell,
Committee discussion, August 10, 1988)

- Ontario Hydro develop, and submit for public review and regulatory approval, policy proposals for independent generation on the following issues:

(a) standard prices;
(b) standard contracts;
(c) interconnection standards; and
(d) special rates for backup and maintenance power.

(Technical Advisory Panel)

- The highly administrative and controlled approach to independent generation proposed by Hydro for implementation in the short term would not provide adequate information, and based on experience in other jurisdictions would limit the development to very little of the economic potential. Ontario Hydro has not demonstrated that immediately moving to negotiating rates with larger independent producers will develop a large portion of the potential for the generation, even if a more competitive market can be developed in the long term. Nor will negotiations necessarily be more cost-effective than setting a standard price and contract in the short term, given 1) the administrative cost of negotiations, and 2) Hydro's stated interest in evaluating the independent producer's rate of return, which creates incentives for the independent producer to raise its costs to obtain more money. Finally, without tight regulatory oversight, negotiations can easily be perceived as discouraging the industry. Negotiating with a monopoly when there is no other market for one's product and when the monopoly may not be that interested in buying the product for institutional and other reasons can become a take-it-or-leave-it proposition.

(Marcus: Report)

- Adopt the recommendations of the Technical Advisory Panel on assessing and obtaining cogeneration and efficiency, especially those dealing with rates and rate structure for both sale and purchase.

(Energy Probe)

- Concern was expressed regarding intentional foot-dragging on parallel-generation. Other symmetries that tilt against conservation - e.g., the continued application of a version of "the no-losers test" to demand-side options, but <u>not</u> to new supply.

(Energy Probe)

- Each parallel generation proposal should include a complete benefit-cost assessment which considers the provincial economy viewpoint. For competing proposals an auction process may be appropriate.

  The stated limit of five MW for purchase at Hydro standard rates could be used to unduly restrict larger projects. It is urged that all renewable or indigenous fuel-based projects be evaluated on an equal and equitable basis.

(Consulting Engineers of Ontario)

- The following steps were recommended:

  1. Restructure Hydro:

     a) Operating Company

     b) Generation Assets Subsidiary.

  2. Redefine OEB role in system regulation.

  3. Bring "avoided cost" pricing into line with current pure nuclear costs.

4. Implement expanded public purchase policy.

5. Consider divestment of part of existing power generation asset base.

(Enserve)

- A standard buy-back rate should be set for all sources of cogeneration, e.g., for all fuel types. The buy-back rate should be adjusted over time and should be based upon Ontario Hydro's long-run avoided cost.

(Discussion of Diener cogeneration presentation)

- Cogeneration raises questions concerning long-term pricing, buy-back rates, reliability of supply (e.g., interruptions caused by storms) and capital incentives, just to name a few.

(James River-Marathon Ltd)

- The private generation business is positioned to expand but at current buy-back rates and business conditions; we are not planning expansion until these conditions change. The company is being cautious because it needs government policies for business planning.

(Multistream Power)

- Private generation is good generation. It uses private money, it is produced when and where needed, it is more efficient and there is a short implementation time.

(Multistream Power)

- The present Hydro buy-back rate is artificially low compared with the cost of new generation by Hydro. Ontario needs a full avoided cost buy-back range (about six to eight cents per KWH) to bring venture capital into this industry. There is a lot of power available at that price. The province could then move to competitive bidding.

(Multistream Power)

- Lessons from the U.S.'s (especially California's) experience with private power include:

  - utilities must plan for success in the event that there is a greater potential supply than anticipated;
  - a cap must be placed on the amount of power that will be purchased at a given price;
  - a successful program needs regular review;
  - standard contacts were important;
  - regulatory stability was important;
  - outside participation and expertise was valuable;
  - one needs a long-term perspective when planning;
  - backup and maintenance power rates were important;
  - the start-up phase was important and different from the remainder of the program;

- roles of regulators changed as the program developed;
- much attention needed to be placed upon integration of independent power into the power plan and the existing system.

(Hamrin)

- The assessment and release of waterpower sites on a watershed basis plus more agreeable rates could increase the availability of sites.

(Waterpower Association of Ontario: Presentation)

- There is a need to adjust the site availability, i.e. site release by the Ministry of Natural Resources, and approval process to facilitate private waterpower development.

(Waterpower Association of Ontario: Presentation)

- Full avoided cost buy-back rates are necessary if independent hydraulic generation is to meet its promised potential. Cost should be based on the cost that the utility would incur to build its own new generation facility.

(Waterpower Association of Ontario: Presentation)

- Independent generation should be encouraged but not at the expense of higher customer costs. Avoided cost should continue to be the basis for establishing these rates.

(Municipal Electric Association)

- Consideration might be given to the establishment of a new agency - a regulatory agency - to arbitrate disputes between independent producers and Ontario Hydro.

(Blue Apple-Jones)

- The policy with respect to private power should be taken away from Hydro, e.g., new regulatory agency, and made the responsibility of government.

(Blue Apple-Jones)

- Concern was expressed that reliance upon private-sector supply could by-pass the environmental assessment review process.

(Committee discussion regarding Ontario Hydro,
Presentation 114B,
Non-utility generation)

- Parallel generation should be encouraged in anticipation of an expected electric power shortage in Ontario in the mid-1990s. For example, concern was expressed regarding transmission capability in the Sarnia area.

(Dow Chemical)

- Ontario Hydro should pay a fair price to parallel generators. Its pricing policy should be revised as follows:

  (a) The rate paid to parallel generators should be based both on Hydro's avoided capital costs and on its avoided energy costs;

  (b) Escalation clauses in Hydro's contracts should be related to fuel costs.

For example, the economics of refurbishing Dow Chemical's (Sarnia) third gas turbine generator with a capacity of 87 MW depend on Ontario Hydro paying its avoided capital costs. Dow could not justify the investment of $7 million if Hydro is only prepared to pay its avoided energy costs. An additional problem is matching up a long-term gas supply for the duration of a possible purchase contract with Ontario Hydro. Concern was also raised regarding Ontario Hydro's differential treatment of small suppliers, i.e., those under 5 MW.

(Discussion of Dow Chemical brief)

- To realize the full potential of cogeneration four ingredients are necessary:

1. Innovative Marketing

Suppliers of cogeneration equipment and services have the necessary technical knowhow to plan, design and implement cogeneration projects. The missing ingredient is frequently the marketing of these goods and services in a way that meets client needs. In many cases these needs pertain to innovative financing that does not require energy users to dip into their limited capital budgets.

2. Industrial and Institutional Commitment

With the help of government and Ontario Hydro initiatives, industrial and institutional energy users should promote cost-effective cogeneration within their own organizations. Demonstration projects may be the most effective means of creating industry-wide awareness and commitment.

3. Ontario Hydro Commitment

Surveys have shown that industry perceives Ontario Hydro to be less than enthusiastic about cogeneration. Much remains to be done, in particular the implementation of a more integrated supply/demand-based investment planning process, the design, in consultation with industry and government, of equitable buy-back rates based on avoided costs, and active promotion of economically desirable cogeneration projects.

4. Government Leadership

The Government should send signals to all interested parties (industrial and institutional energy users, suppliers of equipment and services and electric utilities) that it is serious about cogeneration. Initiatives should include information and publicity programs and demonstration projects, all tailored to specific subsectors where the gaps between economic and implementation potentials are the greatest. At the same time, the government should provide policy directions (e.g., review by independent body of Ontario Hydro's plans in the context of overall energy sector economics and planning) to Ontario Hydro to ensure that Hydro's power sector planning is in accord with a least-cost energy future for Ontario.

(Diener)

- Support was expressed for the view that Ontario Hydro must have control over the amount of purchases of independent generation and be free to accept or reject any offers.

(AMPCO)

- That the Select Committee reject the standard cost and avoided cost methodology currently used by Ontario Hydro and recommend an appropriate cost methodology for comparing Ontario Hydro's planning alternatives.

(IPPSO)

Drop for the near term the 65 percent capacity factor criterion for full buy-back rate, for parallel generator contracts under 5 MW because the 65 percent cutoff is arbitrary and unnecessarily restrictive.

(IPPSO)

- To permit long-term planning, buy-back rates, structures, formulae, and targets should be set by legislation or regulation, or possibly by legislation specifically enabling the Ontario Energy Board to set the above.

  - The cogeneration buy-back rate should be set at 7.28/KWh for two years or until 300 MW of short-term contracts have been signed, whichever comes first.

  - The parallel generation buy-back rate should be regional and based on the total unit energy cost for new construction. The buy-back rate should be set for two years or 1000 MW, whichever comes first.

  - Off-grid buy-back rates should be based on Ontario Hydro's site-specific cost of service.

(IPPSO)

- Establish a short term incentive buy-back rate for cogeneration based on a full estimate of current costs per KWh sold:

That is, total money spent by Ontario Hydro per KWh-hr sold to its customers in a given year.[2]

This would be a three year contract rate offered each year from 1989-91. Such an incentive rate is designed to encourage private sector investment with capital cost recovery in two-three years. After the capital cost of cogeneration equipment is recovered in three-four years, Ontario Hydro could, at that point, negotiate a medium term generation contract based on gas supply and local avoided total unit energy cost. This approach takes advantage of the current deregulated natural gas marketplace to enable the private sector to install 1000-3000 MW of cogeneration equipment.

(IPPSO)

[2] *Proposed formula:*
Calculation of Proposed Short-term Incentive Rate:

(Total 1989 Inflows)
HR 17 X 1.1.5 p. 63, table 9.11 — *$ 9,236 billion*
---------- = ---------- = *7.28 cents/KWh*
from HR 17 X 1.1.5 p. 59 Table 9.7 — *$ 126.9 TW-hr (IPPSO)*
(Total 1989 Sales)

- Some situations exist in Ontario where an industry produces more electricity than it requires, or could do so by utilizing waste products. We believe it makes sense to feed the surplus into Ontario Hydro's transmission system for use in other locations. The only concern is determining an equitable price.

  We do not believe Ontario Hydro should be forced into a situation where it must, by legislation or regulation, buy electricity from private producers. All factors considered, we believe Ontario Hydro is the most appropriate agency to determine what value privately-generated supplies of electricity might have to its customers.

  (Chalk River Technicians)

- We are pleased that as the result of a policy shift, we are now able to work with Hydro on trying to apply cogeneration to mutual advantage, with consequent potential improvement in our relative competitive position.

  (Du Pont)

- Resource diversity has considerable value. With 60 percent of energy coming from nuclear power, cost advantages from future nuclear units must be great to outweigh increased dependence on this generation technology.

  (Marcus: Testimony)

- Concurrence expressed with encouragement of independent generation and suggestion that the experience of utilities in the U.S. with the benefits and pitfalls of independent generation be carefully analyzed and factored into Hydro's future planning. It is important that the purchase of independently produced energy be conducted in such a way as to provide primary benefit to the consumer. The principle of not purchasing independent power above avoided cost is appropriate, but sometimes difficult to calculate in practice. Nevertheless, every effort should be made to avoid unwarranted subsidization of independent generation by consumers.

  (CEA)

- Electrical energy produced through cogeneration is a lot less expensive than the cost of electricity through bulk generation undertaken by Ontario Hydro. Consideration might be given to a financial analysis of the benefits of government investment to reduce pay-back periods to promote cogeneration.

  (Diener)

SUPPLY OPTIONS: GENERAL

Treatment in DSPS

5 Supply Options: 5.1 Supply General

5.1 Major increases in supply will be provided by the lowest cost supply or purchase options available to meet the need after allowing for the effects of demand management and independent generation.

Submissions/Testimony

- For 1987 the average cost of existing generation is: 1¢/KWh for hydraulic, 3.2¢/KWh for nuclear and 4¢/KWh for fossil.

(Ontario Hydro,
Presentation 5,
A Marriage)

NEED FOR MAJOR SUPPLY
JANUARY 2008
(Median Load Growth)

LOAD	MW	CAPACITY	MW
BASIC FORECAST	34,800	EXISTING + COMMITTED (Including Darlington)	33,9000
LOAD SHIFTING	(1,200)	RETIREMENTS	
ELECTRICITY EFFICIENCY IMPROVEMENTS	(2,400)	- HEARN + KEITH (not economic long-term)	(1,500)
		- LAKEVIEW (retired)	(2,300)
		- T BAY #1-CTU (combustion turbine unit) (retired)	(100)
INTERRUPTABLE LOADS	(800)	GENERATION LESS RETIREMENTS	30,000
		INDEPENDENT GENERATION	1,200
PLANNING FIRM LOAD	30,400 (median forecast)	TOTAL GENERATION	31,200
REQUIRED RESERVE	7,300	SUPPLY NEEDED (new supply)	6,500
REQUIRED GENERATION	37,700		37,700

(Ontario Hydro,
Presentation 115A,
Supply General, K Snelson)

- Hydroelectric power, purchases and generation using nuclear or fossil fuels are Ontario's large scale options. Our policy is that all of these options are to be kept open as long as possible. Actually choosing from among these options will require an examination and a weighing of a whole range of trade-offs. Decisions based on these trade-offs are ultimately the responsibility of Government. We depend, though, on information from independent studies, the reviews of DSPS and material provided by other ministries and by Ontario Hydro.

  (Ministry of Energy)

- The Ministry of Energy urges Ontario Hydro to keep the major supply options open. With regard to new supply, the Ministry concurs that supply and purchase options should be pursued after allowing for demand management and independent generation. However, the Ministry cautions that other factors need to be considered in addition to the lowest cost in assessing supply options. The Ministry agrees with the high priority given to improvement and refurbishment of existing generating plants.

  (Interministerial Review;
  response of the Ministry of Energy)

- The supply/demand options proposed by Ontario Hydro adequately cover all available economic alternatives. However, more consideration could be given to natural gas as a generation fuel, in conjunction with coal, and to exports.

  (Interministerial Review;
  response of the Ministry of
  Treasury and Economics)

- The mix of demand/supply options chosen should be based on the lowest total customer cost which include costs incurred by customers, municipal utilities and Ontario Hydro.

  (Municipal Electric Association)

- In reviewing the growth rate of power demand in Ontario, I think by any measure you have to regard it as a great critical issue. As we see it, sources of new energy to Ontario are limited on a practical basis to gas, coal, nuclear and direct imports or the possibility of Ontario Hydro taking equity positions in other developments outside the province to ensure the energy supply from outside.

  (Bechtel)

- Ontario Hydro should not be prevented from using any particular supply option provided it meets the criteria of cost effectiveness, security and environmental standards.

  (Municipal Electric Association)

- As has been the practice, all options should continue to be assessed on long-term cost effectiveness and customer satisfaction.

  (Municipal Electric Association)

- A broad-based planning strategy, including practical demand management options, maintenance and rehabilitation of existing supply facilities, state-of-the-art conventional generating technologies, and the development of promising alternative supply technologies, is in the best interest of the people of Ontario.

  (FESA)

- We view the maintenance of multiple options as an important thrust. It would be unwise to foster an over-dependency on either a single technology or single scale of project development. The mix of large and small supply increments adds flexibility to the overall system.

(CEA)

- Ontario Hydro generally omits or ignores costs or supply options that are "external" to Ontario Hydro, including:

  - business risk (esp. nuclear);
  - liability for (i.e., total cost/risk of) nuclear accidents;
  - lack of diversity (esp. nuclear);
  - health effects; and
  - acid rain, greenhouse effect (esp. coal).

(Energy Probe)

- Concern was expressed that Ontario Hydro underestimates its own future "internal" supply costs, mostly through unwarranted optimism about future nuclear performance and costs. Examples:

  - Life expectancy and amortization period;
  - Annual and lifetime capacity factors;
  - Discrepancies in costing between Ontario Hydro's "ideal" or "next" plant and its "real" plants, especially Darlington NGS;
  - Accounting for major (and unbudgeted) safety upgrades, and other responses to reactor and component aging;
  - Costs of decommissioning and waste disposal;
  - Cost of effect of increasing dependence on large units on need for reserve plants; and
  - Accounting for heavy water.

(Energy Probe)

- We need a specific policy commitment by Ontario Hydro to indicate when new additional generating capacity will be added and transmission and distribution capabilities enhanced.

(Electrical Manufacturers' Association)

- There is a need for Ontario Hydro to produce a firm emergency supply plan: redevelop the Hean and Keith generating stations; introduce IGCC - Integrated Gassification and Combined Cycle - technology as a stopgap measure; buy 2000 MW from neighbouring utilities; and complete Darlington B by 1998.

(AMPCO presentation)

- Through shared operating reserves and coordinated maintenance scheduling, NEPOOL participants have improved the reliability of their bulk power system. Coordinated generator and transmission maintenance scheduling increases system reliability by reducing the risk of multiple outages and results in more customer demand being served by existing generation. This has become particularly important during the last five years as rapid load growth in the New England region has virtually eliminated the availability of surplus generation during the region's winter and summer peaking seasons.

  (NEPOOL)

- The 1987 NEPOOL fuel mix for the production of electrical energy was: nuclear 28 percent, coal 16 percent, oil 32 percent, purchases 14 percent, hydro and natural gas 5 percent each.

  (NEPOOL)

SUPPLY APPROVALS

Treatment in DSPS

5.2 Supply Approvals

5.2.1 Ontario Hydro will seek improvements to the planning approval process to provide increased flexibility.

5.2.2 Approval for new transmission to incorporate new generation shall be sought as part of the generation approval process.

Note: Lead time = the sum of the planning and approval time plus the construction time.

Submissions/Testimony

- Major saving in customer cost can be achieved by reducing the lead time.

(Ontario Hydro,
Presentation 115B,
Supply Approvals, J McConnach)

- The lead times, for the completion of major hydraulic, fossil, nuclear or purchase options range from 6-13 years. The lead time for demand management could range from 3-15 years for full implementation, however, energy savings appear early in the program and such a program does not require the long approval process of major supply options.

(Ontario Hydro,
Presentation 6,
Need for new resources, A Marriage)

- Ontario Hydro suggests that an optimum approval process is one that ensures that broad public interest is acceptably met in the shortest practical time.

(Ontario Hydro,
Presentation 115B,
Supply Approvals, J McConnach)

- Ontario Hydro is participating in the Ministry of the Environments' Environmental Assessment Act review process.

(Ontario Hydro,
Presentation 115B,
Supply Approvals, J McConnach)

- Ontario Hydro planning should continue to reflect the current approvals process. In particular, Hydro should plan on the basis that the next proposed large-scale central generating station will have to go through a full environmental assessment including public hearings.

(Interministerial Review;
response of the Ministry of Energy)

- The Ministry of the Environment does not view as appropriate the draft strategy's anticipation of future changes in the Environmental Assessment approval process. While Hydro may wish to participate in improvements to the approval process, such changes have not yet been realized. Approvals for those plan options which arise out of the draft strategy are therefore subject to the approvals process as it currently exists.

(Interministerial Review;
response of the Ministry of the Environment)

- I do not wish to suggest for the sake of being able to proceed with a project that all rules and controls should be forgotten. It is absolutely essential that care be taken of our environment. Legislation must exist to insure that development of a project does not destroy it. However, it is equally important that legislation promote the development of financially and environmentally sound projects. Quite simply the evaluation process should determine the quality of the project and whether it proceeds or fails. The red tape of the process should never defeat any project.

(Orillia Water, Light and Power)

- All transmission line routings should continue to be part of a separate hearing process, given the very serious and complex review required. Hydro's suggestion of a combined hearing, lumping in both generating facilities and transmission lines, is totally unacceptable.

(Hunter)

- The present planning process is too difficult and cumbersome and far too time consuming. Given the great uncertainties in the load forecast, one way to more closely match the supply to the load would be to shorten the time for approval for construction of generating facilities and associated transmission lines.

(Ontario Mining Association)

- We believe that all legislative statutes which effect the whole review process must be amended to reduce the time involved in the planning, development and implementation phases. These times would be varied, depending upon the type of generating facility - for example - two years for approval of a hydraulic plant to five years maximum for the approval of a nuclear plant.

(Etobicoke Hydro)

- Criteria and strategies should be established and set that will be known to be acceptable in advance for meeting environmental approvals and political acceptability.

(Discussion of Joint Industry Task Force presentation)

- Decisions regarding major supply options should be made as soon as possible, and planning activity should begin because delays may limit choices to uneconomic options.

(Municipal Electric Association)

- Improvement in the approval process is needed. Considerable delays should be minimized because the economic implications may be far reaching. In addition to making changes to the approval process, delays could be minimized if Hydro reduced misunderstandings with the public by obtaining input from interested parties during the planning stages.

(Municipal Electric Association)

- Transmission approvals should be an integral part of any generation approval process, so that commitments to new supply options are not made without appropriate transmission requirements.

(Municipal Electric Association)

- There must be a fundamental reform of the obsessively regulated environment for both Ontario Hydro and the municipal utilities. Regulatory reform is essential to the successful implementation of the Draft Strategy.

(Etobicoke Hydro)

- The Ministry of Housing supports Ontario Hydro's intention to seek improvements in the planning process. Approval processes can often lead to delays in putting development infrastructure in place. This can lead to delays in construction which ultimately translate into additional costs which are passed on to the consumer.

(Interministerial Review;
response of the Ministry of Housing)

- We recognize that the review and approval process for Hydro's projects is already long and burdensome. Rather than simply adding a technical review as another step, the whole train of regulatory procedures needs to be examined with a view to streamlining it. The existing statute under which consolidated hearings are held in Ontario shows what can be done. We believe the results of such streamlining would be well worth the effort it would entail.

(Technical Advisory Panel)

- Streamlining approval processes, particularly for new supply options, is the most important contribution government can make in the orderly development of an efficient electricity supply. To limit uncertainty, lead times must be reduced.

(AMPCO;
similar viewpoints expressed by Municipal
Electric Association and Joint Industry Task Force)

- Any increased generation, such as nuclear and fossil plants, be built on sites close to the areas needing power in order to reduce the adverse impacts on people living in other areas and to allow the areas needing the power to pay the extra costs.

(Mackesy)

- While agreeing that approval for new generation and the transmission to incorporate it should be obtained at the same time, disagree with the separation of approvals for need and environmental acceptability.

(Mackesy)

- Concern expressed that approvals banking could further lead to damage to the environment based on hypothetical need rather than actual need.

(Mackesy)

- Every effort must be made to ensure that legitimate oversight hearings and reviews are conducted as efficiently as possible. Where several levels of government are involved, hearings should be either held concurrently or one level of government should be vested with the responsibility for conducting the review.

(CEA)

- The requirements for social and environmental impact reviews is supported and more emphasis should be placed on defining the process in order that proper planning and scheduling may take place. The cost of delays in these processes and the impact on system reliability should be identified.

(Consulting Engineers of Ontario)

- Transmission issues are not dealt with in detail in the strategy although transmission planning is an integral part of the planning process. In particular, the draft strategy should indicate that the planning of transmission facilities by Ontario Hydro will take full account of Provincial land use policies.

(Interministerial Review;
response of the Ministry of Energy)

- While Ontario Hydro's draft planning strategy addresses the questions of adequacy, security and reliability of supply, the Ministry of Housing feels that it does not address the matters of transmission and distribution in adequate detail.

(Interministerial Review;
response of the Ministry of Housing)

PLANT SIZE

Treatment in DSPS

5.3 Unit Sizes, Plant Size Flexibility

5.3 **Single or two unit commitment of economically sized units in multi-unit stations will be considered to maintain flexibility**

Submissions/Testimony

- Large stations (i.e. fossil or nuclear with an optimum unit size in the 500 - 1000 MW range) offer economies of scale related to efficiency, lower capital cost per KW, and fewer staff needed. Units of 500 - 1000 MW only represent 2 - 3 per cent of system size.

  (Ontario Hydro,
  Presentation 115C,
  Unit Size, Plant Size and Flexibility, K Snelson)

- Four unit generating stations are 15 - 20 per cent less costly over their full lifetime than single unit stations. Nonetheless "despite careful design, faults that affect several similar units do occasionally happen and the system should have robustness of design for such events."

  (Ontario Hydro,
  Presentation 115C,
  Unit Size, Plant Size and Flexibility, K Snelson)

- On balance large stations and heavy transmission is the more flexible system to operate.

  (AMPCO)

- Ontario Hydro should focus more attention in its power system planning on technologies offering the advantages of short lead times and staged development.

  (Technical Advisory Panel)

SITE ACQUISITION

Treatment in DSPS

5.4 Site Acquisition

5.4 New sites for major generating plant shall be sought to allow generating stations of economic size to be built while maintaining a geographical balance of electricity demand and supply.

Submissions/Testimony

- Specific siting considerations include: availability of cooling water, available land area, transportation access, and integration into the existing transmission system.

(Ontario Hydro,
Presentation 115D,
Site Acquisition, J McConnach)

EXISTING PLANT

Treatment in DSPS

5.5 Existing Plant

5.5.1 A high priority should be given to maintaining and improving the performance of the existing supply facilities.

5.5.2 Rehabilitation or redevelopment of existing facilities should be assessed along with the other demand and supply options.

5.5.3 To provide a flexibility margin, consideration should be given to retaining in a preserved state existing plant that has reached the end of its useful life.

Submissions/Testimony

- Ontario Hydro's existing and committed supply facilities will be the backbone of the system to meet the Province's electricity needs well into the next century.

  (Ontario Hydro,
  Presentation 115E,
  Existing Plant, A Marriage)

- After the year 2000 more new plants may be needed to replace existing plants than to meet growth.

  (Ontario Hydro,
  Presentation 2,
  L McConnell)

- Improvements in existing hydraulic and nuclear plants provide: increases in the production capability of lower cost energy; more capacity which delays the timing for building new facilities; and fewer capacity reductions and premature shut downs due to environmental constraints and equipment obsolescence. Rehabilitation and redevelopment may also extend the operating lives of existing facilities.

  (Ontario Hydro,
  Presentation 115E,
  Existing Plant, A Marriage)

- A moth-balled plant provides flexibility to respond to various uncertainties such as load growth, approval delays, fuel supply disruptions, low water conditions and unforeseen equipment outages.

  (Ontario Hydro,
  Presentation 115E,
  Existing Plant, A Marriage)

- Etobicoke Hydro fully endorses that, wherever economically and technically feasible, aging plant should be rehabilitated and repaired - if those repairs and rehabilitation will extend the life of the plant for a fair number of years. There is a general belief amongst utility professionals that Ontario Hydro has not paid sufficient attention to the maintenance and repair of its infrastructure and that such activities are absolutely essential for customers to receive reliable and economical power at all times.

  (Etobicoke Hydro)

ALTERNATIVE GENERATION

Treatment in DSPS

5.6 Alternative Generation

5.6.1 Ontario Hydro will continue to investigate the technical and economic feasibility of alternative generation sources, particularly those that use renewable and Ontario resources.

5.6.2 Ontario Hydro will implement alternative generation sources in specific situations (e.g. isolated systems) where they are the most beneficial alternatives.

Note: Alternative generation may include: solar/photovoltaics, wind, fusion, pumped energy storage, fuel cells, municipal solid waste, wood, biomass, peat, and lignite.

Submissions/Testimony

- In general alternative generating systems are not deemed to be economic for bulk electricity supply over the DSPS planning horizon. Specific isolated applications will continue to be investigated.

  (Ontario Hydro,
  Presentation 115F,
  Alternative Generating Systems, W Penn)

- Alternative technologies (e.g., solar, wind) with their high costs are considered as having a role in supplying off-grid remote communities.

  (Ontario Hydro,
  Presentation 8C,
  Options - Supply, W Penn)

- Fusion, pumped energy storage and fuel cells are international programs. However, they are not considered economic within the DSPS planning horizon.

  (Ontario Hydro,
  Presentation 115, F/I
  Alternative Generation Systems, W Penn)

- Earth energy is now the preferred load management option amongst the principal U.S. utilities and is being aggressively promoted both directly and through the rural electrical cooperatives. This load management resource . . . continues to be largely ignored or unrecognized by Ontario Hydro.

  (Canadian Earth Energy Association)

- Ontario Hydro's preference for indigenous renewable resources is consistent with the Ministry of Natural Resources' Crown Land as a Development Tool initiative. In keeping with this initiative, the Ministry encourages Ontario Hydro to support the promotion of specific programs with social and economic benefits to stimulate local economies.

  (Interministerial Review;
  response of the Ministry of Natural Resources)

- The draft DSPS identifies solid waste incineration as an alternative source of energy. The Ministry of the Environment's policies requiring Best Available Technology Economically Available (BATEA) and strict emission limits must be applied to any EFW facility.

  (Interministerial Review;
  response of the Ministry of the Environment)

- Municipalities are showing an interest in energy from waste technology because of its potential for reducing the need for waste disposal sites. This technology could be discussed in greater detail in Ontario Hydro's draft strategy in view of the technology's potential role in electricity generation.

  (Interministerial Review;
  response of the Ministry of Municipal Affairs)

- The so-called "alternative" sources of energy supply, solar, wind and biomass, have been loudly touted by some self-styled energy "experts". All of these sources are a long way from economic usefulness except in some very limited applications. Ontario Hydro rightly dismisses them from playing any significant role in its planning strategy.

  (Chalk River Technicians)

- Co-generation: supported where economic; unlikely to exceed 300-500 MW additional.

  Small Hydro: supported where economic; the price paid should reflect the avoided-cost of new capacity only when the unit has a reliable water supply, is dedicated, and is of reasonable reliability.

  Municipal Waste: potential is limited; potential for dioxin emission is a concern.

  Wind-power, Solar, etc.: not economic.

  (FESA)

- Renewable technologies should be critically examined and those showing promise should be brought through the experimental stages to pilot plant levels as soon as possible so that a realistic future energy mix can be defined.

  (AECL Professional Employees)

- Solar is part of the solution to energy requirements and can compete (i.e. financially) with other energy forms.

  (Solcan Ltd)

- Ontario Hydro would not need to construct new generating plants if most homes and businesses had energy storage means, e.g. storage batteries, to help shave peak demand. A demonstration project to the regard should be begun.

(Pasquan)

- A system was described in which hydraulically compressed air is used to replace the compressor on a gas turbine and a heat exchanger is used to warm the gas for combustion. This technology was described as being able to magnify the power output of any hydraulic site by combining gas and hydraulic generation in a manner that produces yields greater than the sum of the two technologies used independently.

(Nirabro Industries)

ALTERNATIVE FUELS - NATURAL GAS OR OIL

Treatment in DSPS

Note: **Because of their high fuel costs, fossil oil and/or gas generation are "not part of the strategy elements we are proposing in Chapter 12." These options are considered to have a limited role in meeting long-term energy requirements.**

(Ontario Hydro,
Presentation 8C,
Options - Supply, W Penn)

Submissions/Testimony

- Gas is not attractive to produce electricity in the long-term. In this context it is a high-cost fuel with low-efficiency.

(Ontario Hydro,
Discussion before Committee,
L McConnell, August 11, 1988)

- Ontario Hydro's Draft Demand/Supply Planning Strategy is seriously flawed. It considerably underestimates the potential for the use of natural gas as an electricity supply option in both the short and long terms.

  Use of natural gas can offer many advantages, including:

  - diversification of fuels and technologies used in electricity generation;
  - increased overall electricity supply reliability and flexibility at reduced costs;
  - private sector financing;
  - a cleaner environment; and
  - use of energy-efficient technologies and the stimulation of technological innovation.

(ONGA)

- Ample supplies of natural gas are available for the generation of electricity in Ontario, and at competitive prices.

(ONGA)

- Natural gas technologies are a serious alternative to new nuclear facilities and they can reduce the risks and uncertainties associated with load forecasts and the availability of other supply options. Natural gas technologies are an alternative which meet Hydro's own criteria, i.e., they offer short lead times and remove large volumes of emissions at lower cost than scrubbers.

(ONGA)

- We do not believe Ontario Hydro should plan to operate the oil-fired Lennox Generating Station except as an alternative source of supply in emergencies. The cost of generation is too great to permit its use for even peak load supply on an ongoing basis. A reasonable argument can be made however, that, in an electrical system as large as Ontario's, a resource such as the Lennox station can be justified as insurance in case of emergency. It should therefore be maintained in a condition to permit reasonably quick start-up with adequate fuel stockpiled for winter conditions.

  (Chalk River Technicians)

- While gas is excellent over the short term and provides a quick fix, I do not think that is a good long-term option and I think the people in the gas industry would generally agree with that. Although they want to sell a lot of gas right now, they are doing it but it is just too good for domestic use and there is no substitute for domestic use.

  (Bechtel)

- DSPS gives little recognition to the strategic role of natural gas. Security of gas supply could be achieved through long-term gas contracts of 20 or more years.

  (Blue Apple-Jones)

- Small increments of purchased power from private sector gas-fired cogeneration and smaller scale utility-owned plants converted to gas from coal or oil allow a power utility to respond quicker to market need, plan more effectively and dilute the social political and environmental risk of long lead time "mega" power projects.

  (Sceptre Resources)

- Strong encouragement expressed for Select Committee to endorse concept of significant gas fuelled independent power generation as part of Ontario Energy supply strategy (e.g. R.L. Hearn proposal). The benefits of such a facility could serve to substitute for coal plants or coal plants with scrubbers.

  (TransCanada and Consumers Gas)

- Repowering with natural gas, e.g. use for refurbishing of existing coal-fired stations, is energy efficient technology and improves the management and operation of existing plants.

  (Blue Apple-Jones)

HYDRAULIC GENERATION

Treatment in DSPS

5.7 Hydraulic

5.7 **The economic hydraulic developments should be undertaken in an orderly program.**

Submissions/Testimony

- Available hydroelectric sites could supply some peaking capacity, about 8.5 per cent of the growth in consumption up to 2008.

(Ontario Hydro,
Presentation 8C,
Options - Supply, W Penn)

- There is a potential of 9300 MW of undeveloped hydraulic electricity in our province. However, contrary to popular belief, there is only a relatively small amount of energy involved, particularly when allowance is made for:

  (a) protection of waterway parks,
  (b) the environmental sensitivity of northern rivers,
  (c) treaty land rights, and
  (d) the economics of development.

  Seventeen economic sites, mainly in Northern Ontario, with a total capacity of 2750 MW, remain for development in the next 20 years.

  Ontario is preparing environmental assessments for Little Jackfish GS, Mattagami Extensions GS and studying the Niagara Development. These, more immediate economic plants, account for about 1000 MW of the 2750 MW economic potential.

  Ontario Hydro does not have the water rights on these sites but has registered them. If Hydro concludes that it is not economic for it to develop these site(s) they would be released to others.

(Ontario Hydro,
Presentation 115G, Orderly
Hydraulic Program, W Penn and L McConnell,
discussion, August 11, 1988)

- Regarding hydraulic resources, the Ministry of Natural Resources would consider releasing a specific site to the private sector for development should Ontario Hydro decide it does not wish to develop that site.

(Interministerial Review;
response of the Ministry of Natural Resources)

- The remaining hydraulic potential in the province will incur high capital costs. The average life-time energy cost is estimated to be about one and a half times the present generation system cost.

  With the exception of the potential Niagara Development, all undeveloped resources are remote from the load centres and will require extensive transmission lines.

Special methods may be required to sustain the environment or minimize the project impacts.

(Ontario Hydro,
Presentation 115G,
Orderly Hydraulic Program, W Penn)

- Instead of proposing hydraulic development as an "orderly program" Hydro should specify and prioritize the sites for development. If some of the several hundred megawatts available do not meet Hydro criteria, consideration should be given to releasing these for private sector development or exploring innovative joint development possibilities.

(Consulting Engineers of Ontario)

- Support expressed for further hydraulic development where this is warranted. Increasing generating capacity and efficiency at Niagara Falls obviously makes sense, as do several of the other smaller projects mentioned in the draft document. We would note however that hydraulic generation is subject to its own environmental problems.

(Chalk River Technicians)

- Hydraulic is OK but availability is limited.

(AMPCO)

- The safest, most environmentally acceptable form of generation is hydraulic, but, unfortunately, the best sites have already been exploited, leaving the costliest, most unreachable sites in Northwestern Ontario. While much preferred as the most economical and reliable, the hydraulic option can only provide a very limited contribution to overall MW needs.

(Etobicoke Hydro)

- Support expressed for hydraulic where economically justifiable, or to meet regional load demand, provided there is not any significant negative impact on existing recreational usage. Further hydroelectric development should follow an orderly river-system approach, giving priority to rivers which are already partially-developed or indirectly affected by existing developments.

(FESA)

NUCLEAR GENERATION

Treatment in DSPS

5.8 Nuclear

5.8 Ontario Hydro will seek to maintain CANDU nuclear so that it is available for future development.

Submissions/Testimony

General Considerations

- In 1987 nuclear power comprised 33 percent of the electrical capacity in Ontario. The nuclear stations met 51 percent of Ontario's electrical energy needs. By 1993 with the completion of Darlington, nuclear stations are expected to meet 65 percent of Ontario's electricity needs.

(Ontario Hydro,
Presentation 115H,
Maintain the CANDU Option, W Penn)

- Nuclear is considered a least-cost option for base load generation.

(Ontario Hydro,
Presentation 8C,
Options Supply, W Penn)

- The reference plan for the nuclear option takes into account at least one retubing for every nuclear plant during its lifetime. A sensitivity analysis is also done assuming retubing twice.

(Ontario Hydro,
L McConnell, Committee discussion,
August 5, 1988)

- The Ministry has urged Ontario Hydro to continue to take steps to keep the major supply options open. In particular, we support the maintenance of the CANDU nuclear option so that it will be available for future development. CANDU plants have provided Ontario with reasonably-priced supplies of electricity at lower costs and environmental emissions than coal-fired stations.

(Ministry of Energy)

- Because of Darlington's low incremental cost and the uncertainties associated with short-term options, all units of Darlington should proceed on schedule.

(Select Committee on Energy [1986])

- In view of the established potential of other supply options and the apparent potential for pursuing demand management initiatives, no further commitment should be made for additional nuclear power stations at this time.

(Select Committee on Energy [1986])

- On the basis of our reconnaissance, we concluded that the maintenance management systems in place at the operating nuclear plants [i.e. within the Production Branch] are inadequate to help management ensure high levels of productivity at those plants. This is a particularly important finding in light of the importance of the nuclear stations to Ontario Hydro. Deficiencies in the existing systems have been identified within Ontario Hydro, and some efforts are underway to address the situation. Nevertheless, specific steps should be taken to ensure that the end products of the on-going efforts will be fully effective. Further, adequate resources should be applied to implement appropriate systems at the operating nuclear plants as soon as possible.

  (CRESAP, p 9)

- The nuclear option involves the use of proven Candu technology, and Ontario Hydro has obviously been heavily involved in this for years. It is clean, the risks are known, we have the fuel and we have the means to reprocess spent fuel. Studies on slightly enriched uranium for Candu plants make the use of this fuel even more efficient.

  (Bechtel)

- Although the Elliot Lake uranium mines have made tremendous strides in productivity, it is unlikely that these low grade underground operations can offer prices as low as those attained by the high grade open pit uranium mines of Northern Saskatchewan.

  In spite of this, we contend that the savings that can be achieved by buying uranium from another political jurisdiction not only ignores the excellent record of dependability of delivery and supply that Elliot Lake mines have developed over the past three decades, but also pales in comparison with the loss of investment and economic spin-offs as well as the socioeconomic costs of the demise of a vibrant community in Northern Ontario.

  (Elliot Lake)

- Our community views its mining industry's relationship with Ontario Hydro as an equally beneficial means for this community to break away from the "boom and bust" cycle, and achieve a measure of security and prosperity that is seldom achieved in Northern Ontario.

  (Elliot Lake)

- In environmental terms, [he] is much less anti-nuclear than was the case 10 years ago because of the negative effects of fossil fuel combusion (i.e., acid rain, other emissions, greenhouse effect). But would still see coal and nuclear as last resort options.

  (Paehlke)

- Bulk supply needed in the 1990s; nuclear is preferred.

  (AMPCO: presentation)

- The provision of Nuclear Power Plants will reduce Ontario's dependency on out-of-province energy sources. Let me ask you "Where are we going to get our future energy from, fossil fuels? Fuels that seriously affect our environment? From Hydro electric plants for which water is not available in Ontario?" Maybe we should import Hydro from Quebec or Manitoba and export Northern Ontario jobs to these provinces. We cannot give up jobs in Northern Ontario. We must provide jobs in Northern Ontario, not in Quebec or Manitoba.

  (Elliot Lake Chamber of Commerce)

- Ontarians have already made another decision, to slow down nuclear power expansion. We know we can't change that. And we also don't expect Ontario to design its electrical generation system around the needs of a few thousand miners in Elliot Lake. We're much more realistic than that.

  But there are a couple of things that we do expect. We think that, when it is clearly in the overall economic interest of the province to do so, Ontario Hydro should continue to buy the uranium it needs in Ontario and help to preserve the jobs and the community in Elliot Lake. And when the broad policy decisions on the future of the electrical generation system are being made, the obligation of Ontario to those of us who work here must be recognized.

  (USW)

- The town supports the continuation of nuclear power generation and the maintenance of long-term uranium-supply contracts between Ontario producers and Ontario Hydro. Reductions in Elliot Lake's uranium production would have serious impacts on Blind River, including the 400-500 workers who commute to the mines and the spin-off benefits to the Town's businesses.

  (Blind River)

- As a municipality, we are concerned that the Province of Ontario keep all of its energy source options open and these include the uranium supply within this province . . . the Council of the Township of the North Shore believes that a continuous viable uranium industry in Elliot Lake is best for this province and good for the local economy. The Ontario energy strategy should both recognize this and make it an integral part of that strategy.

  (Township of the North Shore)

- Concern raised regarding the earthquake design requirements of Ontario's nuclear power plants.

  (Ferahian)

- As Ontario Hydro is preparing its plans for the electricity system, the Ministry of Transportation would like Hydro to give consideration to the transportation requirements for radioactive material that might be involved in Ontario Hydro's nuclear strategy options. The Ministry is also concerned with the transportation requirements of moving and erecting transmission lines and transformers.

  (Interministerial Review;
  response of the Ministry of Transportation)

<u>Nuclear Costs</u>

- Among major developed countries the range of nuclear electricity costs varies from 4.39 cents/KWh in the United States to 2.04 cents/KWh in Canada.

  (CNA)

- The relative uncertainties and risks associated with nuclear construction, operation and decommissioning should be carefully re-examined to ensure that they are adequately captured in Ontario Hydro's standard cost system and economic analyses.

  (Coal Association of Canada)

- It was admitted that it is very difficult to get a handle on nuclear power costs, i.e., cross-country and cross-reactor comparisons. The costs within a country are often masked by a variety of subsidies, and international sales can be very strongly influenced by a government's contribution to the financing arrangements and by a company's willingness to transfer most of its technology.

(Ahearne)

- Before any significant commitment is made to additional nuclear installations, the Ontario government initiate and obtain the results of an independent, thorough review of Candu nuclear costs in Ontario conducted by eminently qualified experts.[3]

(Technical Advisory Panel;
this recommendation was supported by
the Municipal Electric Association)

[3]*Note:* *During his presentation to the Select Committee on August 2, 1988 Mr. Wong indicated that he would be acting on this recommendation with the results ". . ., if it was practical, . . . to have such a report available so that this [Energy] committee could review it." Mr. Franklin also indicated that such an independent review was being considered by Ontario Hydro and would now be subsumed into the Ministry's inquiry in this regard. On October 19, 1988 Mr. Wong announced the establishment of an inquiry into nuclear costs in Ontario with Ralph Brooks, Chairman and Howard Bowers as the second panel member.*

- The social and environmental costs of both coal and nuclear as well as the risk created by placing too many eggs in one basket should militate against any commitment to further centralized supply at this time.

  If the Committee does wish to rank supply options like coal, nuclear and interprovincial purchases, we recommend you do not do so until the CANDU costing study is available.

(Energy Probe)

- Reservation expressed on the one cost whose accuracy is most crucial for the whole DSPS exercise: the cost of nuclear-generated electricity. All reasoning and comparisons seem to be revolving around the assumption that nuclear energy is the cheapest supply option. What if the assumption is wrong?

(Connor-Lajambe)

<u>Reliance Upon CANDU Technology</u>

- The risk of Ontario Hydro being virtually the only customer for the CANDU system should receive closer examination than heretofore.

(Coal Association of Canada)

- Purely as an individual I do have an opinion. The dependence of the province on the nuclear component for power by the year 1993 will be about 69 percent. That is a very high proportion. That is a very large number of eggs to put in one basket. It is higher than anywhere else - except in France and Belgium. I do not really think I want to put all my eggs in one basket and I think that one should go for a measure of diversification in the means of power generation when one uses an electrical system.

- A striking feature of the Hydro Report is the low cost attributed by Hydro to nuclear generation with Candu technology. We were struck by this feature for two reasons:

  - From the data presented, the cost of nuclear generation is so much lower than the costs of alternative possible kinds of generation that nuclear costs appear likely to drive the evaluation, outweighing other considerations and maintaining a central role for new Candu installations in Hydro's plans.

  - In the world of power system planning, the Candu costs attributed by Hydro appear to be low.

(Technical Advisory Panel)

- We have been unable to verify the accuracy, validity, or reliability of Hydro's nuclear cost estimates. The discrepancies we have found cause us to be concerned about the use of these costs in comparing nuclear generation with other options. In comparing options all costs should be included, should be on the same basis, and should be supported by indisputable evidence or data. This is essential for all options, and certainly there should be no departure from the principle in the case of Candu generation.

(Technical Advisory Panel)

- Hydro states that it expects pressure tube performance in future to be better than experience to date. Hydro assumes that Darlington and all future units will require a single retubing at year 30 which will require an outage of two years. Existing reactors need tubes more often: every 12 to 23 years for the oldest currently operating reactors. The outages have lasted longer too: 46 months for Pickering 1 and 60 months for Pickering 2.

  While it seems reasonable to expect improved performance from redesigned tubes and faster retubing methods, experience to date raises doubts about Hydro's planning assumptions for Candu costs. Unforeseen problems have been underestimated. There is nothing in the information provided by Hydro to indicate that this pattern has been stopped.

(Technical Advisory Panel, Appendix C)

- The opportunity exists for further research and development to reduce the costs of retubing. A high confidence was expressed that the next nuclear plant to be committed would only have to be retubed once. A "2 retubing" sensitivity analysis is, however, also conducted by Ontario Hydro.

(Ontario Hydro,
L McConnell and K Snelson,
Committee discussion, August 11, 1988)

- The capacity factor performance of reactors plays a large part in nuclear cost estimates. The outages in Pickering 1 and 2 for retubing reduced the lifetime capacity factor of those units about 10 percent. The assumption used in standard costing the Candu is that the plants will have an average lifetime capacity factor of 80 percent.

  However, we note that from 1984 to 1987 Hydro's reactors had capacity factors averaging between 70 and 75 percent annually. Many of these units are still new, and none have yet reached half their expected lifetime. We find it difficult to believe that the lifetime average capacity factors of Candu will reach the planning estimate.

(Technical Advisory Panel, Appendix C)

However, I should point out that the alternative in this province is fossil fuel and there are reasons why fossil fuels create problems.

(Hare)

- The general opinion was expressed that Ontario Hydro is "more balanced [rather] than overreliant" on nuclear power. When you only have one particular design, obviously you put a lot of effort into making sure you have that design constantly being looked at. You have research going to make sure that you stay abreast of any precursors that might indicate there might be new problems.

(Ahearne)

- Nuclear power stations are economically competitive. Over the lifetime of plant, the per kilowatt-hour cost of nuclear electricity is less than that from coal fired stations. We expect that the Minister's independent review currently being carried out on the cost of nuclear energy will confirm this conclusion.

(Canadian Nuclear Society)

- The draft strategy should also examine the value of diversity in relation to the increasing dependence on nuclear power. Encouraging fuel diversification as a strategic principle, while not without costs, could enhance the overall security of the Ontario electricity system. While the Ministry of Energy concurs that the likelihood of technological problems with nuclear is fairly remote, the size of the potential consequences if plants must be shut down will vary with the level of nuclear dependence. This means that taking diversity considerations into account in planning decisions is a prudent course of action.

(Interministerial Review;
response of the Ministry of Energy)

- Nuclear energy should be supported and expanded; all the smaller or short-term options should be used but not as subterfuges to delay and thereby weaken the nuclear options.

(AECL Professional Employees)

- It is essential the Select Committee arrive at a decision regarding which of the two available generation options should be pursued by Ontario Hydro, i.e. nuclear or fossil fuel. No other option will satisfy the long-term electric power needs of the province. Further delay in taking this important decision is unacceptable.

(Linde-Union Carbide)

- Given the concern for the environmental aspects of the burning of nonrenewable fossil fuels, it would be imprudent not to take full advantage of our highly developed nuclear assets for use both by present generations and those that follow.

(CNA)

- That Ontario Hydro initiate action immediately for the construction of a major generating station to come into service after Darlington 4.

(AMPCO)

- We urge the Committee to conclude that Hydro's nuclear program has been a wise choice for Ontario and that it would be prudent for Hydro to plan to meet at least a 4% electricity growth rate to reduce the possibilities, in a very uncertain world, that lack of electricity supply capability will limit Ontario's economic growth and opportunity.

(CNA)

- There is an urgent need to inject a greater confidence in Hydro's ability to supply the needs of a growing Ontario economy. Ontario's homegrown Candu system offers a proven option which commends itself to your consideration on the basis of provincial employment and environmental considerations.

(CNA presentation)

- From an environmental standpoint, economic competitiveness, and our own future needs, Ontario must adopt the most attractive electrical supply option available to it, the CANDU reactor system. Ontario Hydro's planning strategy must recognize a greater role for nuclear generation or else it has no strategic value.

(Chalk River Technicians)

- We believe the CANDU reactor system should play a much greater role in Ontario Hydro's future planning strategy. The people of Ontario expect their elected officials to make the serious decisions necessary for our continued well being. And, we believe, they will support a recommendation from you in favour of nuclear energy as part of that goal.

(Chalk River Technicians)

- Although there may or may not be a need to commit construction of additional nuclear units, we believe that it would be prudent to start the planning and approvals process soon if we are to retain the opportunity of constructing additional nuclear capacity to meet the probable future electricity needs of Ontario in a timely manner.

(CNA)

- Given current concerns relating to the combustion of fossil fuels, nuclear power appears to have environmental benefits for future supply in addition to the economic advantages claimed by Ontario Hydro.

(Joint Industry Task Force)

Waste Disposal and Decommissioning

- Support expressed for the timely completion of the concept assessment phase of the Canadian Nuclear Fuel Waste Management Program, and the preparation of a strategy for development and implementation of a successful nuclear waste disposal concept.

(FESA)

- The cost of nuclear waste disposal - 100 percent of estimated costs of disposal - and decommissioning are included in costs of nuclear. However, there is an element of uncertainty in this regard.

(Ontario Hydro,
L McConnell, Committee discussion,
August 5, 1988)

- Nuclear waste disposal is a nagging problem. Few countries are making progress on it in the sense of finding a site where you would put the waste. There is a lot of work going on in many countries of various types of incapsulation and various types of studies on how to do a geological depository, but actually getting one has turned out to be extraordinarily contentious.

  (Aheame)

- In the United States estimates for decommissioning of a 1,000 megawatt reactor can run anywhere from $80 million U.S. to $400 million U.S. The uncertainties are driven I think by two major factors: first, no major reactor has ever been decommissioned; second, what level of return use will be demanded?

  (Aheame)

- The technology exists to decommission a nuclear plant to any selected condition, from Stage 1 - Storage with Surveillance - to a return to green grass. A delayed-dismantling decommissioning scenario has been developed which starts with static state, going beyond Stage 1 so as to put the site into a condition in which annual maintenance and operations costs, as well as radiological risk to the public, are minimized. It is ultimately followed in 80 to 100 years by Stage 3 or put to other use - such as building another plant.

  Our philosophy has been that as long as there is no immediate demand for re-use of the site, it is preferable and cost-effective to delay complete dismantling for 80 to 100 years. Through the perpetual radioactive decay, the radiation levels from most short-lived isotopes become inconsequential after about 80 years. This, in turn, means that less remotely-controlled equipment will be required for dismantling, meaning that simpler tools can be used with fewer special efforts required to keep worker exposure at safe levels.

  (AECL; presentation by D S Lawson)

- The Canadian concept for the permanent disposal of nuclear fuel waste is to bury it in a multi-barrier disposal system in the rock of the Canadian Shield, one of the most stable areas in the world. Various container designs and materials have been tested, and it has been concluded that a thin-shelled titanium container would last in the groundwater found deep in the Canadian Shield for at least 500 years, during which time the radioactivity of the fuel would be greatly reduced. Our studies indicate that copper is also a suitable container material, and could be used to make an even longer-life container.

  We are proposing that the disposal containers be surrounded by compacted bentonite clay. This material swells considerably when it becomes moist, thus providing an effective seal, and water movement through it would be extremely slow. Most of the radioactive waste products in used fuel react chemically with such clay, which further inhibits their movement. This disposal concept will be reviewed by a federal Environmental Assessment Panel, with full public hearings.

  (AECL; presentation by K W Dormuth)

- Ontario Hydro is responsible for interim storage of eradicated fuel and technical work is proceeding, directed by the Federal Minister of Energy, Mines and Resources and involving AECL, to select and bring into service a disposal facility, although after 2010.

  (Ontario Hydro,
  Presentation 115H,
  Maintain the CANDU option, W Penn)

- Standards of decommissioning have not been set, and waste disposal costs have yet to be determined. Consequently there are really no reliable estimates of such costs. For that reason it is a point on which nuclear cost estimates in both the United States and Canada are vulnerable to being proved far too low.

(Technical Advisory Panel, Appendix C)

- It was indicated that there is uncertainty regarding those cost components that we have not yet experienced, specifically on decommissioning and radioactive waste disposal. Sensitivity analysis is conducted on these estimates.

(Ontario Hydro,
Discussion of Presentation 115H
Maintain the CANDU Option, L. McConnell, August 11, 1988)

- The bottom line in decommissioning is that the technology is available, affordable and generates manageable quantities of waste. I think there is a better chance that the costs will go down in real terms than up as new technology comes along to make the job even easier in the future. Even if I am wrong in that and the costs go up, even by a factor of two percent, you can see it is not going to have much impact on electricity consumers.

(Thexton)

- The Canadian spent fuel management program is very similar to what is going on in much of the world. Most countries plan to store fuel until after the turn of the century because they do not have very large volumes, there is not a pressing need to hurry through and start to dispose of it, so they plan to store the fuel at reactor sites in pools or canisters or some sort of surface storage for quite some time. The Canadian program is at least as advanced as that in other OECD countries and it is providing strong international leadership in some ways.

(Thexton)

- The fuel waste produced by nuclear power stations is small in volume. The total amount of such waste generated in Canada since the first CANDU reactor began operating in 1962 could be contained in one Olympic size swimming pool.

  Storage of fuel waste by the method presently used (i.e., in the form of intact fuel bundles in water-filled pools) is safe and reliable for at least 50 years. There have been and are ongoing national and international research and demonstration programs which are designed to demonstrate the scientific and engineering components of a long term disposal plan. Canada, with its experimental underground research laboratory, is leading the field in this area. We are nearing the time when we will be able to demonstrate to all reasonable people that nuclear wastes can be immobilized and stored safely in deep rock disposal vaults.

(Canadian Nuclear Society)

Maintaining the CANDU Technology

- The problem of maintaining CANDU technology in Canada is a most serious challenge facing not only Ontario Hydro but Canada as a whole.

(AMPCO)

- The Ministry of Energy supports the strategic element of maintaining the CANDU nuclear option so that it is available for future development. CANDU plants have provided Ontario with reasonably-priced supplies of electricity at lower costs and environmental impact than coal-fired stations. Also, they have operated at a high level of safety.

  Nevertheless, the Ministry feels that the strategic elements with regard to nuclear are incomplete, in that steps that may be taken to maintain the CANDU option and some cost uncertainties with regard to nuclear should be explained.

  (Interministerial Review;
  response of the Ministry of Energy)

- The cost of maintaining the Candu option is relatively low; the capability is needed for the maintenance of the existing stations; the manufacturing capability of a few unique products such as fuelling machines and pressure tube supply would have to be retained.

  (Ontario Hydro,
  Presentation 115H,
  Maintain the CANDU option, W Penn)

- I believe that Canada will maintain a viable nuclear industry at a rate of sales of something less than one per year. I think this will keep that industry intact to the turn of the century.

  My assumption is that beyond the turn of the century, there will probably be very close to enough Canadian sales on an ongoing basis to keep a viable industry. If we can survive until the turn of the century, there may be enough orders going along that nuclear becomes at least assured of ongoing survival and possibly quite an attractive industry to be involved with.

  (Thexton)

- The Ministry of Industry, Trade and Technology finds the strategic elements regarding the nuclear supply option incomplete and vague. The strategy should consider the large employment impact, capacity for technology diffusion and R & D potential. Of all the demand and supply options in the strategy, the nuclear one provides the largest economic impact on gross provincial product and employment at the lowest cost.

  (Interministerial Review;
  response of the Ministry of
  Industry, Trade and Technology)

- The nuclear power industry is a major Ontario industry which should be supported. Failure to maintain the nuclear option, while other options are being considered or implemented, may result in the loss of qualified and experienced industrial suppliers.

  (FESA)

- Nuclear energy should be supported and expanded; all the smaller or short-term options should be used but not as subterfuges to delay and thereby weaken the nuclear options.

(AECL Professional Employees)

- A commitment to eventually build a nuclear facility in the near future would help maintain Canada's CANDU technology capability. Without any reassurance from Ontario Hydro many nuclear suppliers and personnel may permanently withdraw from the industry, thus making future production of CANDU reactors, arguably the world's safest and most efficient design, unfeasible.

(Municipal Electric Association)

- In order to have the ability to meet the high demand forecast economically, work should commence as soon as possible on preconstruction on new nuclear stations. If demand growth continues at its present high rate, Hydro's CANDU technology may be the only option which could economically reduce acid gas emissions.

(Municipal Electric Association)

- The building of a CANDU 3 (450 MW capacity) reactor in Canada could foster other sales.

(Discussion of ACEL presentation)

- Given the long lead time required to plan, construct and commission large, multi-unit CANDU generating stations, very serious consideration should be given to the CANDU-3 with a capacity up to 450 MW design developed by AECL.

  Eastern and Northeastern Ontario are short of electrical supply now, the main reason the Lennox thermal station was reactivated. The upper Ottawa River is an ideal site to locate this new generating station. Sufficient cooling water exists in the reservoir behind the Des Joachims hydraulic station dams, Ontario Hydro owns some land in the area and the local area is supportive of the concept.

  As the site of most of the Canadian nuclear industry, the province stands to profit from demonstrating this new AECL reactor design. It is designed to meet the requirements of smaller countries where electrical systems cannot easily adapt to the output of large reactor units. It also can fit into larger systems when small, incremental increases in supply capacity are needed. As such it represents the reactor design expected to be in most demand throughout the world for the next decade. Canada can win sales in this market, particularly if a working CANDU-3 can be demonstrated.

(Chalk River Technicians)

- The Select Committee should seriously consider and encourage the supply option provided by modular nuclear plants rather than the large Darlington-style station, which requires substantially longer lead time. A viable and acceptable supply management option exists in the installation of a modular nuclear station on the Ottawa River upstream of Des Joachims.

(Deep River)

- The Committee should recommend the continued and expanded use of uranium fuelled programs using uranium mined and processed in Ontario.

(Blind River)

- Ontario's present nuclear program has demonstrated its safety. From the environmental and waste disposal aspects, nuclear has demonstrated its superiority compared to the major alternative of coal-fired generation. There are considerable economic advantages for Ontario's economy if its own mineral, manufacturing and manpower resources are applied to the supply option chosen, as would be the case with nuclear.

(Canadian Nuclear Society)

- Ontario Hydro's nuclear program should be maintained including the role played by Elliot Lakes uranium mines. The following points merit attention:

  - the advisability of maintaining a secure source of uranium for Ontario's nuclear program;

  - an increase in Ontario Hydro's nuclear generating capabilities makes sense for Ontario; and

  - fueling Ontario's nuclear power plants with uranium mined exclusively in Ontario makes economic sense for our province.

(Elliot Lake)

- We submit that the Candu nuclear industry is even more vital. The nuclear industry today employs about 30,000 Canadians directly and roughly twice that many indirectly. Most of these jobs are in Ontario. In mining, manufacturing, construction and operation right across the province.

(CNA)

- The nuclear option should be maintained so that it is available when future major additions to base-load generating capabilities are required. The lead-time for nuclear, coupled with the estimated supply shortfalls by the year 2000, suggest that planning and design work for another 4-unit nuclear plant should be initiated soon, as design staff become available with the completion of Darlington.

(FESA)

- Nuclear development planning should consider the smaller unit sized currently being proposed by AECL and recognize the existence of strong nuclear engineering capabilities external to Hydro.

(Consulting Engineers of Ontario)

International Perspectives on Nuclear Power

- Sweden has decided to phase-out nuclear power by 2010 and also to dismantle 2 of its reactors ahead of time, i.e. in the mid-1990s. Associated with this decision are the following policies:

  - the development and competitiveness of Swedish industry must not be jeopardized by a shortage of available energy;

- research in the field of alternative energy sources should be stepped up;
- the use of indigenous energy will be promoted (e.g. waste and peat);
- limitation in the use of electricity will be advocated and where possible electricity will be replaced by other sources of energy.

Under this policy, the use of coal will increase but with strict emission control targets on acidic emissions and requirements that the production of carbon dioxide must not exceed current levels. On this latter point it was indicated that it was unclear how this objective would be met.

(Ullsten)

- Among nations which generate more than 500,000 gigawatt hours of electricity from nuclear sources, only four countries have lifetime load factors above 75 percent for their operating nuclear power plants. Canada ranks first with a load or capacity factor of 78.6 percent.

(Aheame)

- On the basis of lifetime load factors CANDU reactors compare very favourably with other nuclear plants. Ontario Hydro has done very well with its CANDU reactors.

(Aheame)

- By international standards Ontario Hydro has chosen a reactor type which has clearly demonstrated its ability to operate with a very high capacity factor of very high system reliability and is operating it very well.

(Thexton)

- Based on international experience, the Canadian nuclear power research and development effort has been, and is continuing to be, remarkably cost-effective.

(Thexton; supplementary information on the Future of the Canadian Nuclear Industry)

HARE NUCLEAR SAFETY REVIEW (1988): MAJOR CONCLUSIONS AND RECOMMENDATIONS

(unless otherwise indicated, the following points are drawn from the Hare Review)

- The Minister of Energy should appoint an independent panel of internationally-recognized experts to review, on a priority basis, the safety of the design, operating procedures and emergency plans associated with Ontario Hydro's CANDU nuclear generating plants. The panel should prepare a report to the Minister which should also be made available to the Members of the Legislature.

(Select Committee on Energy [1986])

Overall Safety

Major Conclusion 1 - Overall Safety

The Ontario Hydro reactors are being operated safely and at high standards of technical performance. No significant adverse impact has been detected in either the work-force or the public.

The risk of accidents serious enough to affect the public adversely can never be zero, but it is very remote.

Ontario Hydro Corporate Affairs

Major Recommendation 1 - The Human Element

That Ontario Hydro:

(i) ensure that, at an early date, its operational organization be thoroughly reexamined, in close cooperation with independent consultants who have international management experience;

(ii) commission a study of factors affecting human performance throughout the utility, for the purpose of achieving optimum efficiency and the maintenance of high standards of safe operation;

(iii) examine and revise its arrangements for establishing and maintaining an overall quality assurance programme for each of its plants after taking advice from independent specialist consultants.

Pressure Tube Issues

- The matter of greater concentration on the pressure tube issue was raised and the opinion expressed that Ontario Hydro's financial contribution to this research is on the small side.

(Hare)

Major Recommendation 2 - Integrity of Pressure Tubes

That maximum and effective priority be given to finding a solution to the pressure tube problem, and to improved in-reactor monitoring. Investment in fuel channel research by Ontario Hydro should be increased, and greater emphasis given to the fundamental metallurgical problems, tapping expert knowledge available in other industries.

Other Conclusions and Recommendations

Research and Development

Recommendation 3

That Ontario Hydro, as the producing utility, assume responsibility for the full financing of research needed to guarantee safety and efficiency in its own nuclear generating programme, purchasing facilities and staff time from AECL and other corporations and universities as appropriate.

Other Ontario Hydro Practices

Recommendation 4

That the President of Ontario Hydro appoint a technical Advisory Committee on Nuclear Safety, similar to that already established for the nuclear fuel waste management programme, drawing on the industrial and academic communities. This committee should publish an annual report, which (with the report of Ontario Hydro's Nuclear Integrity Review Committee [NIRC]) should be laid before the Ontario Legislature.

Reactor Performance

Recommendation 5

That Ontario Hydro press forward the large-scale upgrading of process and safety systems at Pickering A so that there may be no impediment to its future safe operation.

Recommendation 6

That a consistent policy be established by the Atomic Energy Control Board (AECB) governing the backfitting of existing reactors. This policy should specify targets for work-force exposure. It should take account of uncertainties in safety analysis. It should also establish a firm timetable for completion of work.

Operating System

Recommendation 7

That Ontario Hydro further refine and intensify its training and refresher courses in all aspects of reactor safety and in safety management, making maximum use of its control room simulators.

Risk of Accidents

Recommendation 8

That Ontario Hydro extended severe accident analysis to:

(i) the case of loss of regulation plus failure to shut down; and

(ii) representative Bruce and Darlington reactors.

Emergency Measures

Recommendation 9

That the Province of Ontario at once appropriate the funds necessary to set in place the preparedness aspects of the Provincial Nuclear Emergency Plan.

Recommendation 10

That the Province of Ontario base its nuclear emergency planning on the maximum credible releases of radioactive materials.

Health Matters

Recommendation 11

That the Government of Ontario ensure that all relevant information be provided to support AECB's feasibility study for an epidemiological analysis of cancer incidence and mortality near reactors, and to any other feasible proposal for such analyses, including effects other than cancer mortality.

Recommendation 12

That the Government of Ontario create an Advisory Council on Health and Safety, with a small permanent staff, and with the funds to assist public interest groups that wish to make representations.

Regulations

Recommendation 13

That AECB retain its present powers, sanctions, and functions, but ensure that its decision (and reasons for them) are promptly published and enforced. Its staff complement should be increased to permit a broader programme, particularly in the radiological, socio-economic, and environmental areas.

Recommendation 14

That the Atomic Energy Control Act be amended so as to increase the Board's membership, to permit appointments of persons expert in socio-economic and environmental areas.

Recommendation 15

That AECB's Advisory Committees on Nuclear Safety and Radiological Protection be given the resources to expand the scope, accelerate the timetable, and increase the visibility of their work.

Recommendation 16

That relations between Ontario Hydro and AECB become more formal, and that the reasons for all regulatory decisions be fully documented.

FOSSIL (COAL) GENERATION

Treatment in DSPS

5.9 Fossil

5.9 Ontario Hydro will maintain and improve its knowledge of new developing coal burning technologies that promise reduced emissions and/or increased flexibility.

Submissions/Testimony

- IGCC, Integrated Gassification and Combined Cycle, is a system with two stages.

  In the first stage, pulverized coal is converted to coal gas, and 95% to 99% of the coal sulphur is removed and contained.

  In the second stage, the gas enters a combustion turbine generator to produce electricity. Cycle efficiency is improved by utilizing waste heat from the gassification plant and combustion turbine.

  From the point of view of avoiding acid emissions, IGCC is the cleanest available coal technology. It cannot avoid CO_2 emissions, but it does have the lowest levels on a Mg/MWh basis, due to its higher efficiencies.

  IGCC is a flexible technology, since it can be built and operated in stages. To bring additional generating capacity on-line as quickly as possible, only the first stage would be built. It would burn natural gas or oil in a combustion turbine-generator. This stage would have very high operating costs, but could be used to help meet peak loads. Subsequently, a coal gassification stage could be added. This would reduce operating costs, making the facility suitable for somewhat higher load-factor operation.

  IGCC (as a mature technology) will have capital costs comparable to a similarly sized conventional coal-fired station with scrubbers. It has higher cycle efficiency than conventional plant, but its operating cost remains to be fully demonstrated.

  (Ontario Hydro,
  Presentation 115I
  Clean Coal Technology, W Penn)

- FBC, Fluidized Bed Combustion, is a system where limestone (or other lime products) are introduced into the bed of the combustor boiler to retain the sulphur and nitrogen compounds in the pulverized slag.

  The fluidized bed concept is currently most suitable for the rehabilitation or retro-fit of older conventional fossil-fired stations. A preliminary evaluation of the technical implications of retrofitting atmospheric fluidized bed combustors in R.L. Hearn G.S. and J.C. Keith G.S. has been performed. It is too early to reach conclusions.

  (Ontario Hydro,
  Presentation 115I
  Clean Coal Technology, W Penn)

- To meet future acid control requirements by 1994 Ontario Hydro is conducting research into acid gas control by sorbent injection (limestone, dolomite, hydrated lime) for possible application to existing fossil stations. This research also has possibility for technology transfer.

  (Ontario Hydro,
  Research Division, M Moses, August 12, 1988,
  Presentation)

- External expertise should also be fostered in the area of emerging fossil fuel burning technologies. This is an opportunity for Ontario consultants to work with Hydro to obtain and develop the knowledge and skills in these technologies.

  (Consulting Engineers of Ontario)

- A variety of processes are available that may increase the efficiency of coal-fired systems and reduce environmental emissions. However, the lead times to install these systems may be substantial.

  (Williams)

- Fossil coal is considered as having potential for peaking and intermediate power requirements.

  (Ontario Hydro,
  Presentation 8C,
  Options - Supply, W Penn)

- Looking at coal as an option, there is a perception that CO_2 produced and the greenhouse effect will be increasingly difficult to overcome. It is conceivable that coal plants in the future may be even more difficult to site than nuclear plants.

  (Bechtel)

- Fossil is OK but only as a stopgap measure.

  (AMPCO)

- In spite of the impending increased costs, some coal plants may still be required if demand continues to grow at a higher than expected rate. It takes only 12 years from conception to the completion of a four unit coal station and the first unit could be on-line five years after construction starts. Coal units may be the only major power source available in time to meet the demand.

  (Municipal Electric Association)

- Coal should continue to be an option, both for peaking and for short lead-time additions to capacity. New state of the art "clean-coal" technology options and improved environmental controls (such as improved de-sulpherization) should continue to be developed for rehabilitation of new coal-fired units.

  Another issue is the greenhouse effect. The proportion of fossil generation on the Ontario Hydro system is already low, and unless other major capacity additions are initiated, existing and additional fossil generation will be needed to meet future power requirements.

  (FESA)

- Concern was expressed regarding the externalities/adverse impact of coal-fired power generation.

(Energy Probe)

- Ontario Hydro should be moving toward the elimination of large-scale fossil power generation.

(Deep River)

- Electricity planning should be based on a desired future with due regard for the necessity of fossil fuel substitution and the evolution of hydrogen. The real "enemy" is the depletion of fossil fuels.

(AECL Professional Employees)

- The Ministry of Energy supports the strategic element of monitoring the development of new, flexible, clean coal technologies. However, more emphasis should be given to these technologies, including proceeding with the planning of a commercial-size plant. The draft strategy should also have considered more fully the option of increasing the use of low-sulphur Western coal in the supply mix.

(Interministerial Review;
response of the Ministry of Energy)

- Consideration should be given to converting coal-fired stations to natural gas.

(Discussion of Sceptre Resources submission)

- The Ministry of Transportation finds there is no meaningful discussion in the strategy documents that addresses coal supply, sourcing and transportation pricing issues or any strategic directions in those areas.

(Interministerial Review;
response of the Ministry of Transportation)

- Western Canada's low sulphur coal can and should be a significant component in Ontario's energy future. Taking all the relevant criteria (economics, reserves, environmental and safety issues) into account, coal is the optimum choice for power generation and the optimum coal is the low sulphur coal from western Canada.

(Coal Association of Canada)

- Coal fired generation offers flexibility in being able to generate over a wide range of utilization factors to meet these periods of high demand. As a generation system increases in size, more capacity must be available for meeting the daily and seasonal peaks.

(Coal Association of Canada)

- Coal fired generation has a major role to play in Ontario Hydro's future generation strategy because it can offer generation flexibility with security of supply, while meeting the environmental requirements of the Ontario community.

(Coal Association of Canada)

- By using a combination of new technologies and low sulphur coals, Ontario Hydro can achieve diversity and flexibility in its generation mix and continue to meet emission standards.

(Coal Association of Canada)

COMBUSTION EMISSIONS AND THE GREENHOUSE EFFECT

Submissions/Testimony

- Ontario Hydro did not do extensive analysis within DSPS of the potential implications of the "greenhouse effect." Hydro is not motivated to change the strategy due to the greenhouse effect. The greenhouse effect does have implications in the practical application of the strategy and reinforces the merits of demand management and may intensify the nuclear option to substitute carbon dioxide emissions from fossil fuels.

  (Ontario Hydro,
  statement to Committee, L McConnell,
  August 11, 1988)

- Ontario Hydro's plans to install scrubbers at a reported cost of $5 billion will help meet acid gas emission regulations. But this does not reduce CO_2 emissions which are a growing concern relating to global warming. These plans do not anticipate possible requirements for a reduction in CO_2 emissions. This calls into questions both the proposed investment and the overall thrust of that element of Ontario Hydro's strategy.

  The Select Committee should recognize the possibility that alternatives to combustion may become necessary. Ontario has the industrial capability and the economic strength to build on its investments in nuclear generation as an alternative to growing dependence on imported combustion fuels. Consideration should therefore be given to the means whereby new nuclear capacity could be installed in a timely, cost effective and environmentally sound way.

  (Joint Industry Task Force)

- The Ministry is concerned that some of the proposed options may increase atmospheric gases contributing to the greenhouse effect and ozone depletion. Ontario Hydro should assess and seek to reduce the same impact of the options on global climate change.

  (Interministerial Review;
  response of the Ministry of the Environment)

- We would recommend strongly that the older, less efficient coal-fired generating stations be phased out in the very near future. Those located in the most densely populated areas of the province should be at the top of this list. Newer coal-fired stations like Nanticoke and Lampton should be back-fitted with the most efficient emission control technologies available on a priority basis. Further, these stations should be used to meet peak load demand only, not as part of the base load supply system.

  (Chalk River Technicians)

- Concern over SO_2 emissions has grown to include NO_X and CO_2 as the "greenhouse effect" has become of increasing social and political concern. While the technologies exist to reduce emissions, there are significant costs associated with them and there is no assurance that future standards will not change, requiring on-going, expensive modifications.

  (CEA)

- The likelihood of Ontario Hydro being involved in extensive construction of fossil generation appears very slight - given the high degree of public awareness about the impact of acid gas emissions on the environment. Furthermore, these emissions conclusively contribute to the possible greenhouse effect which appears to be enveloping the planet.

(Etobicoke Hydro)

- I think that the majority of people in my profession would say that the greenhouse effect has been demonstrated and that, in any case, people concerned with energy policy and public health should assume that the greenhouse effect is with us and consider its consequences.

(Hare)

- I merely think that in the long-term planning of capital investment pertaining to navigation works, power installations, and other things that involve spending money that is going to be useful 50 years downstream, people ought to take into account the possibility that this climatic change [i.e. the greenhouse effect] is coming. It is not a certainty by a long shot, but I am sufficiently confident of it to feel that it is about time it was on the political agenda and on the management agenda for those people who manage very long-term projects.

(Hare)

- I certainly do not think that the province should abandon its nuclear capability. I am torn. I think 70 percent is a dangerously high proportion of eggs to put in one basket. On the other hand, it is true that nuclear technology does not contribute to the greenhouse effect, not at all. And it is also true that the greenhouse effect suggests a threat to hydro electric supplies.

(Hare)

- One of the big arguments in favour of nuclear power all along has been the near term environmental advantages. Assuming there is no accident, clearly the pollution from a nuclear power plant is much less than the pollution from a fossil-fuel-burning plant. The greenhouse warming is the first major issue that seems to indicate that perhaps fossil fuels ought not to be burned. Nuclear power is being revisited by large numbers of groups, both internationally and in North America. Many environmental groups are beginning to rethink their opposition to nuclear power.

(Ahearne)

POWER PURCHASES

Treatment in DSPS

6 Purchases

6.1 Ontario Hydro will continue to depend on neighbouring systems for emergency support to a level that is consistent with mutual benefit.

6.2 Long term firm purchases of hydraulic power from neighbouring provinces will be considered as an acceptable alternative to building new supply facilities.

Submissions/Testimony

- Interconnections may: provide emergency support which improves reliability and reduces reserve requirements; reduce operating costs and rates; provide access to long-term firm purchasers which provide alternative supply and diversity of supply. This latter option, however, has long lead times due to the need to build new generation in the other systems and related transmissions outside of and within Ontario.

  (Ontario Hydro,
  Presentation 116,
  Purchases, A Marriage)

- The pricing of major firm purchases will be a function of the suppliers costs, alternative markets, i.e. U.S., and Ontario Hydro's other alternatives.

  (Ontario Hydro,
  Presentation 116,
  Purchases, A Marriage)

- The major firm purchase option should not be pursued at this time. It should be re-evaluated once cost-effective indigenous resources, such as conservation and co-generation, have been utilized.

  (Select Committee on Energy [1986])

- The Ministry views major power purchases from other provinces as a significant option and supports stronger interconnections with other provinces. Competitive price and supply security will be crucial factors in determining the Government's view of a proposed purchase.

  (Ministry of Energy)

- All reasonable efforts should be made to keep the purchase option open given the size of the resource and the possible benefits.

  (Interministerial Review;
  response of the Ministry of Energy)

- Major long-term firm purchases from either Manitoba or Quebec due to generation and transmission construction requirements would not be available until the late 1990's or early 2000's. Such purchases would be expensive due to the need to build new generation and the alternative high cost American market for such power. These neighbouring provinces are apparently not interested in lease-back arrangements or joint ventures.

(Ontario Hydro,
Presentation 8D,
Options Purchases, A Marriage)

- Long-term purchases of hydraulic capacity and energy from neighbouring provinces have a number of advantages:

  - use of Canadian renewable resources;
  - no acid gas emissions;
  - increased energy diversity for Ontario; and
  - the environmental impacts in Ontario are limited to those associated with the transmission facilities.

  disadvantages:

  - most of the economic activity associated with jobs, materials and manufacturing will be in the other province, not in Ontario;
  - there is less flexibility to adjust construction schedules if requirements vary or to cancel if load growth is lower;
  - there may be limited operating flexibility depending on the terms negotiated in the contract; and
  - the purchase will need to be replaced earlier than if Ontario Hydro builds its own generating station. Ontario Hydro hydraulic and thermal generating stations are expected to last at least 80 and 40 years respectively, whereas the purchases may only last 20 to 30 years.

(Ontario Hydro,
Presentation 116,
Purchases, A Marriage)

- Interconnections with neighbouring systems provide short-term assistance and enable Ontario Hydro to reduce its current generating reserve requirements by 700 MW or 15 per cent of the total reserve requirements. The figure is periodically revised and could be reduced if neighbouring utilities found themselves in a "tight" supply situation.

(Ontario Hydro,
Presentation 116,
Purchases, A Marriage)

- Positive consideration should be given to purchasing electricity from neighbouring provinces, where such purchases are economic. The overall optimization of electricity price structures and delivery infrastructures, in our view, can best be accommodated through a regional approach to planning rather than an exclusively provincial one. It is recognized, of course, that the need for transmission corridors and the cost of building transmission lines must be factored into the decision-making process, however, there should be no arbitrary provincial preference imposed during the evaluation of competing "build or buy" options.

  (CEA)

- Purchasing power from a neighbouring province would not have the same negative impact on our air quality as a coal station, but there is an environmental cost brought about by the transmission lines which would be required in Ontario. Nevertheless, this option may be worth pursuing if an attractive price could be negotiated.

  (Municipal Electric Association)

- External purchases are desirable. A more promising approach to purchases from Quebec and/or Manitoba might be to plan the development of bulk electricity supplies in all three provinces as a joint undertaking which would take advantage of the complementary nature of Ontario Hydro's mixed hydro/thermal/nuclear system with each of its pure (essentially) Hydro neighbours.

  (AMPCO)

- Looking at imported energy, importer equity participation projects could be a good option outside the province. One thing it does is it provides some incentives to go ahead with integrated grid systems with the utilities on either side of Ontario, i.e., Manitoba and Quebec. The aspect, therefore, of importing power and the cost could be somewhat mitigated by the overall efficiencies of the larger system.

  (Bechtel)

- Ontario Hydro should accelerate negotiations for long-term hydraulic power purchase agreements from Manitoba and Quebec before too much is committed elsewhere. Potential shortfalls of available power should be averted by securing assured sources having minimal environmental impact and high acceptance. Purchases of hydraulic power available at reasonable cost from Quebec and Manitoba offer the opportunity to meet these objectives if early commitments can be obtained. Available hydraulic power will afford time for alternate supply technologies to develop and mature with experience and the elimination of unacceptable secondary effects. Purchase agreements will also provide opportunity for Ontario Hydro to further reduce debt load and develop a sound financial plan for future supplies.

  (Windsor Utilities Commission)

- Ontario Hydro's mandate from the province is to supply electricity at the lowest possible cost over the long-term. That mandate has been supported consistently by the people of the province for several generations. We do not believe this mandate extends to long-term purchases of electricity from other provinces, when the same electricity can be generated more cheaply within the province using Ontario expertise, resources and skilled workers. Ontario has the capability and the knowledge to do this and, we believe, Ontario Hydro has the duty to carry it out.

  (Chalk River Technicians)

- With regard to the possible economic impact of purchasing 2000 MW of electricity from Hydro Quebec the following findings emerged:

  - The Nottaway-Broadback and Rupert (NBR) complex of Quebec is the most likely source of the purchased power. However, this area has not yet been developed and would require investments of over $11 billion in 1985.

  - The cost of the most favourable purchasing arrangements for 2000 megawatts of electricity would exceed $4.7 billion in 1985 in the first 10 years of the agreement. This is if the price of purchased power is based on the cost of constructing nuclear plants in Ontario.

  - The economic impacts of a 2000 megawatt purchase causes a $5.9 billion in 1985 decrease in economic activity in Ontario relative to constructing equivalent power generating capacity in Ontario.

  - If Ontario were to depend entirely upon purchases from Quebec to meet incremental demands of 4000 megawatts, the impact (reduction) on economic activity would exceed $19 billion in 1985 from 2000 to 2010.

  - The consequences of Ontario's purchasing power from Quebec could be mitigated by equity participation [not favoured by Quebec], sourcing construction materials in Ontario and negotiating a lower purchase price. Since Hydro Quebec is actively pursuing sales to markets in the U.S., negotiated prices are likely to reflect the substantially higher cost of power in New England and New York rather than the favourable rates that now exist in Ontario.

  This purchase option will also have a positive impact upon the total national product of Canada. In summary the economic impacts of a major purchase on Ontario are very large and very negative.

  (Osten)

- The employment impact within Ontario of the various supply options should be one of the factors taken into consideration in choosing between alternatives. In this respect, we feel that the option of large-scale bulk imports of power from neighbouring provinces should be considered only if there are significant savings in "delivered" power costs over "made in Ontario" generation options.

  (FESA)

- Ontario Hydro's mandate does not include purchasing significant electrical power from outside the Province of Ontario. Purchasing large amounts of power is effectively exporting jobs to those provinces.

  (River)

- Hydro's examination of long term power purchases must include the impact on the Ontario economy of alternative in-province project deferrals. By examining only the effect on rates and the possible savings over in-province options the economic costs will not be included.

  (Consulting Engineers of Ontario)

- Etobicoke Hydro cannot agree with the principle of continuing to purchase hydraulic power from neighbouring provinces or states and to have these purchases considered as an acceptable alternative to the construction of new supply facilities.

  (Etobicoke Hydro)

- Interprovincial electricity purchases can come in an almost infinite number of shapes, sizes and types and can, depending on particular circumstances, offer a number of significant benefits to a purchasing utility.

(Pavey)

- Joint ownership of a generating unit by two or more utilities has been a fairly common practice in the United States for a number of years.

(Pavey)

- Despite the potential, the range of different products and the flexibility in sizing and timing inherent in interprovincial electricity purchases can in many situations provide the generation planner with the opportunity to achieve significant cost savings and other benefits that otherwise would simply not be available to his system. Ontario Hydro, flanked by two of the lowest cost electricity producers in the world (Manitoba Hydro and Hydro Quebec) both of whom are very active in the export market, is well placed to exploit these opportunities as they occur.

(Pavey)

POWER EXPORT

Note: No specific DSPS strategy statement on this topic.

Submissions/Testimony

- Ontario Hydro has not committed and does not plan to commit capacity to meet requirements outside of Ontario, i.e. exports. But potential short-term interchange opportunities to sell power would be exploited.

  (Ontario Hydro,
  Committee discussion, L McConnell, August 11, 1988)

- The principle must be that Ontario Hydro became a net exporter of electrical power - not an importer. Let us create new jobs and new wealth and not be constantly dependent upon this job creation from external sources.

  (Etobicoke Hydro)

- There is also a diversity of contract arrangements existing between NEPOOL members and Canadian utilities. The bulk of the electricity purchased from Canada is delivered in the form of economy energy, which is both economical and available during much of the year. The reliability of Canadian energy imports has been excellent and very helpful to NEPOOL during summer peaking season in particular. In 1987, economy energy purchases from Canada amounted to nearly 5.8 million MWH and provided about 5.5 percent of NEPOOL's total electrical requirements. More than $42 million was saved in New England through these economy purchases from Canada in 1987.

  (NEPOOL)

ENABLING LEGISLATION

Submissions/Testimony

Power Corporation Act Review

- The Power Corporation Act review should take into account this Committee's recommendations and the results of the DSPS process to ensure that this revised legislation is compatible with DSPS.

(Committee discussion)

Note: For example, during the appearance by Mr. Edward Ciemiega, Director, Legal Services Branch, Ministry of Energy, on August 3, 1988 it was indicated that the Power Corporation Act does not give Ontario Hydro the authority to make grants for energy conservation programs.

- The Power Corporation Act should be amended to allow Ontario Hydro to engage in the full range of options for promoting conservation.

(Select Committee on Energy [1986])

- As the Memorandum of Understanding is an important mechanism for maintaining Ontario Hydro's accountability, it should become a formal legislative requirement.

(Select Committee on Energy [1986])

Energy Efficiency Act

- The implications and potential of the Energy Efficiency Act for electrical efficiency in all sectors should be reviewed.

(Committee discussion)

Note: The basic issue in this regard was the general compatibility of provincial energy and related legislation with DSPS in order to accommodate the strategy elements in detailed energy policy and program planning.

Ontario Energy Board Act

- The Ontario Energy Board Act should be amended to give the Board the powers to regulate electricity rates.

(Select Committee on Energy [1986])

Municipal Act

- As a municipal utility (The Municipal Act, s. 241 (1)), we are not allowed to go into another municipality to carry out any hydraulic generation development, without the passage of a Private Members Bill granting such permission.

(Orillia Water, Light and Power)

POWERLINE PLANNING AND IMPACTS

Submissions/Testimony

- Given that Ontario Hydro does not listen to the people on this issue, i.e. electromagnetic field powerline impact, and the government has so far shown reluctance to direct Hydro, then a knowledgeable and competent body is needed to deal with disputes on hydro line routings.

  (Hunter)

- The valid concerns of the people affected must take precedence over the corporation . . . after all, only the people can judge what is an acceptable risk.

  (Hunter)

- More money is needed for independent electromagnetic field research. (The present Hydro study has a built-in bias, unlike the New York Power Lines Project which had a panel to screen participation to those without professional or financial bias.) Other jurisdictions are dealing with the issue of EMF and human health. They are passing legislation to protect their citizens.

  (Hunter)

- Since Hydro can not guarantee that their power lines are not a health hazard, Ontario must place controls on high voltage transmission line routings, with firm minimum R.O.W. widths written into law for populated areas. There should be no further construction of these lines next to schools.

  (Hunter)

- The electro-magnetic field issue associated with proximity to high voltage transmission lines deserves its own Select Committee hearings.

  (Hunter)

MISCELLANEOUS

Submissions/Testimony

- The Ministry of Agriculture and Food thinks it would be appropriate to include in the strategy the degree of Ontario Hydro's understanding of the issues of rural Ontario. The planning strategy does not refer to Ontario Hydro's commitment to providing electrical services to rural areas nor does it indicate what priority is given to the needs of rural electricity users.

  (Interministerial Review;
  response of the Ministry of Agriculture and Food)

- The term of the Select Committee on Energy should be extended to allow it to review two specific items.

  1. The establishment of a Consumer Advocate as a method of improving the representation of the interests of the general public in hearings related to electric power planning issues.

  2. The role of Municipal Utilities in facilitating demand-side activities.

  (Select Committee on Energy [1986])

- The strategy will broaden Ontario Hydro's objectives and operations beyond generation and distribution of electricity. Since this will increase the impact of Ontario Hydro on all areas of the provincial economy, MITT believes the utility should be subject to increased responsibility and accountability to the government.

  (Interministerial Review;
  response of the Ministry of
  Industry, Trade and Technology)

- The Ministry of Northern Development and Mines would also like to see some changes made in the cost of access to grid power, particularly to companies opening new mines and to remote communities. The Ministry also comments that in the North adequacy of transmission and distribution impacts reliability of power supply more than generation availability.

  (Interministerial Review;
  response of the Ministry of
  Northern Development and Mines)

- High heating costs in the North exacerbate an already poor housing situation. Poor housing is a principle cause of many of the critical health problems facing our people.

  Housing and economic development are two vital matters over which aboriginal peoples seek to exercise self-government, OMAA's people must be full participants on all those bodies which determine energy pricing policies and set energy prices. We believe it also reasonable to expect that a portion of all revenues form energy sales will be returned to aboriginal communities in order to finance the administration of institutions of self-government.

  (OMAA)

- The greatest impact of the draft strategy on the Ministry of Natural Resources is the effect of new development and extension of existing facilities on Crown Land. The Ministry has developed a number of policies and procedures regarding the planning and disposition of Crown lands, therefore Ontario Hydro must give consideration to the specific legislation under the Ministry's administration, including the Public Lands Act, The Lakes and Rivers Improvement Act and the Federal Fisheries Act.

  (Interministerial Review;
  response of the Ministry of Natural Resources)

- The extent to which the strategy has considered the impact of the Canada - U.S. Free Trade Agreement and the extent to which any assumptions have been incorporated into Ontario Hydro's forecast or strategy have not been discussed.

  (Interministerial Review;
  response of the Ministry of
  Industry, Trade and Technology)

- There are many areas in which consultants can contribute to the development and implementation of Hydro demand and supply strategies. We believe that it is cost-effective and thus in keeping with the stated Hydro principle of cost minimization to develop consulting expertise in the private sector. In addition, as discussed in the Premier's Council Report, the procurement of Ontario goods and services by Ontario Hydro would provide significant benefits in the economic development of Ontario as a whole. We urge the Committee to encourage Hydro to move in this direction.

  (Consulting Engineers of Ontario)

- Hydro should support and maintain the development of new technology capability in Ontario. We believe that in many cases Hydro fulltime in-house expertise is not justified, and that Hydro should be urged to encourage technology development in the private sector. This applies also to the maintenance and promotion of existing technology, particularly in the nuclear energy and the associated waste management fields.

  (Consulting Engineers of Ontario)

- Concern was expressed that electricity in Ontario is artificially cheapened and this affects competition and conservation.

  (Energy Probe)

- We recommend an immediate and far ranging public education effort by the Ministry of Energy. Honest electricity pricing will only lead to optimal consumer response if accurate information about the available alternatives is readily available.

  (Energy Probe)

- Representatives (users, unionists, environmentalists, farmers, natives) should form a fair proportion of the Board of Administration of the utility to insure that all possible policies are studied and that external costs are taken into account at the beginning, thus saving time, energy and aggravation.

  (Connor-Lajambe)

APPENDIX B

APPENDIX B

FINAL

PRESENTATION

TO

THE ONTARIO SELECT COMMITTEE ON ENERGY

Monday November 7, 1988

By

PASSMORE ASSOCIATES INTERNATIONAL

Consultants to the Committee

CONTENTS

			Page
Summary			i
Suggested Recommendations			iv
- Concerning Regulation			
- Concerning Demand/Supply Options			
- Concerning the Value of Power			
- Concerning Parallel Generation			
- Concerning Demand Management			
- Concerning Nuclear			
Fact/Summary Sheet			viii
Section One	-	Process	1
Section Two	-	Equitable Comparison of the Options	6
Section Three	-	Least Risk Planning	10
Section Four	-	Demand Management An Example of Implementation	14
Section Five	-	Additional General Concerns	17
Section Six	-	Policy not Programs	20

Issue Papers (Previously Submitted)

- #1 Alternative Demand/Supply Strategies
- #2 Demand Management
- #3 Forecasting/Uncertainty
- #4 Avoided Cost and Power Purchase Rates
- #5 Bidding for Projects Larger than 5 MW
- #6 Transmission Impacts

Sector Summaries (Previously Submitted)

- Demand Management/Energy Efficiency
- Independent Generation

SUMMARY

1) The consultants are not satisfied that DSPS represents an adequate strategic document on which to base the future of electric generation planning in the province of Ontario.

   Neither the consultation process which led to the DSPS, nor the priorizing and screening of options, nor the representative plans themselves, have been adequate to justify moving toward the identification of alternative or preferred plans.

2) In addition, based both on the evidence presented by numerous expert witnesses and on our own evaluation, it is our conclusion that the DSPS has a number of substantial flaws - particularly with respect to the standard cost methodology.

   As such, Hydro must revisit its analysis of the various resource options (both supply and demand) prior to proceeding to an identification of possible alternative plans.

   Until this is accomplished, it will not be possible to select a preferred plan that is free of considerable and legitimate controversy.

3) Based on their experience with Hydro, a number of witnesses (lawyers, economists, industry associations, educators, ratepayers, project developers) called for the creation of an independent, ongoing technical review body with the legislative authority to assess, revise and/or reject Hydro's power system plans. This body - often suggested as the Ontario Energy Board - would, if necessary, also resolve differences between Hydro and others, and ensure that government policy is being expeditiously and thoroughly carried out.

   This is the single most consistent theme heard at the Committee hearings and, in the consultant's view, is the single most essential ingredient if the potential for options such as parallel generation and demand management in Ontario are to be realized.

   It is important that public input into the DSPS review process be seen as playing an important role. Based on the testimony, not to make a strong recommendation for greater political direction and external review of Ontario Hydro would lead public intervenors to conclude that their input is of minimal value.

   Such a conclusion will not achieve the government goal of proceeding with a preferred plan that has the greatest public consensus.

4) With respect to concerns presented by witnesses forecasting electricity supply shortfalls and the resultant urgent need to proceed with new central supply facilities, we believe these concerns are based on an inadequate understanding of the alternatives to large central plant and on a lack of knowledge of the true costs (social, environmental, but primarily economic) of generating electricity from the large central facility approach.

   Despite this lack of understanding, these professionals are correct in one respect. If this committee recommends a "business as usual" scenario for Hydro, there will be insufficient demand management and parallel generation potential developed to forego the need for new central plant.

   As stated by Ontario Energy Minister Robert Wong in his opening address to the Committee, "We are at -- or near -- a crossroads, a time for choosing the kind of energy future we want." (text pg.9)

5) It is the consultants' view that DSPS is heavily biased toward screening out alternatives which leave little choice but to select the nuclear option as Hydro's preferred power plan.

   These biases include a 4 percent real discount rate, a capacity factor of 80 percent, a plant life of 40 years, and capital costs lower than in the past.

   <u>Taken together, these assumptions, if compared to historical reality rather than conjecture about improved future operations, can amount to increased costs for nuclear of 1.5 - 2 cents/kWh.</u>

   By the same token, other options such as gas are assumed to have high fuel costs or renewable energies to have high capital cost, or demand management investments to be written off over 5 years.

   If nuclear is to be a component of a preferred plan, it must gain that position on its own merits - particularly if, as a choice, it is to stand up to public scrutiny. Based on the evidence presented at these hearings, it is our view that it is far from clear at this time whether the nuclear option, based on a criteria of system flexibility, reliability, or cost effectiveness, is in the best interest of the ratepayers of the province.

   Further, we believe that if the real concern about keeping the CANDU option open relates to ongoing meaningful employment for Ontario Hydro staff working in nuclear engineering and plant design (several thousand persons), then this legitimate concern should be dealt with in an open, straightforward fashion and should not be confused or obscured by the issue of whether nuclear is the most "cost-effective, reliable, environmentally sensitive" option that Hydro should pursue. These latter are legitimate, but seperate matters.

6) Since these Hearings looked intently at the potential for increased initiatives in "alternative options" such as parallel generation and demand management, policy makers should be aware of the minimal cost implications of paying higher rates/incentives for parallel generation/demand management. Given 1000 MW of independent generation (Hydro currently has less than 40 MW) and a payment by Hydro of 6 cents/kWh rather than 3.6 cents, the rate impact would only be 2.89 percent. That is, to pay for 1000 MW of parallel generation at 6 cents/kWh, Hydro would have to increase its average revenue requirement from 4.23 cents/kWh to 4.35 cents/kWh. (see Issue Paper #4, pg.6)

7) The Select Committee has the opportunity to clarify the issues before us, offer clear alternative suggestions to Ontario ratepayers, and provide precise policy directives to the government and Ontario Hydro. In other words, it has the opportunity, as suggested by witnesses, to choose Ontario's electric future rather than reacting to it. (Robinson, Kelly, Torrie, Lajambe)

   The Committee has already had considerable impact during the course of these hearings. Its pursuit of the issues has raised questions to which Ontario Hydro has attempted to respond. There is now some potential for movement.

   This impact to date, and the potential for increased future impact based on the Committee's final recommendations should not be underestimated.

   DSPS is presented as a draft strategy. Therefore, the Committee should not feel inhibited about recommending substantial changes.

SUGGESTED RECOMMENDATIONS

Concerning Regulation:

The government of Ontario should create an independent, ongoing technical review body with the legislative authority to assess, revise and/or reject Ontario Hydro's power system plans. Given the urgency of the situation (real or perceived), and the need to resolve a number of issues relating to demand management, parallel generation and the value of power in the province, the government should move quickly to name the Ontario Energy Board as that body.

The Ontario Energy Board must be given the legislative, financial and human resources to properly fulfill this expanded mandate.

To achieve maximum consensus, Ontario Hydro should engage in as much public consultation as it deems necessary and advisable prior to presenting its demand/supply plans for approval, alteration or rejection to the Ontario Energy Board.

Concerning Demand/Supply Options:

Ontario Hydro must revisit its analysis of the various resource options (both supply and demand) prior to proceeding to an identification of possible alternative or preferred plans.

In comparing resource costs and availability, the government should instruct Ontario Hydro to alter its economic evaluation procedure to provide realistic comparable data. The process could be simplified by including simple levelized unit energy cost evaluations as part of its assessment analysis. The government should instruct Hydro to so do.

When comparing options from a cost perspective, the government should instruct Hydro to interpret environmental and social costs and benefits in the broadest possible fashion. Also, option flexibility and its ability to contribute to risk abatement as well as a level playing field approach to fiscal and tax matters should all be explicitly included in Hydro's comparative costing.

In particular, the government should inform Hydro that it must re-work its assumptions concerning the role of gas, the role of demand management, and the role of independent generation in Ontario's electric generation future.

The government should instruct Hydro to prepare more extensive contingency plans than those used in the representative plans analysis. In particular, these plans should go far beyond the contingencies of dealing with long lead time central generation facilities to include more thorough analysis of the impacts of extensive demand management and parallel generation market penetration.

Concerning the Value of Power:

The government should instruct Hydro that calculations of the value of power from new generation sources (avoided cost) should be based on the full capital and running costs of a new utility plant that public planners have determined would be desireable to avoid. This could be a new coal plant, a nuclear plant or a composite.

Also to be captured in this calculation of full avoided cost should be a value for such ratepayer costs as loan guarantees and Hydro's tax free status which are not currently reflected in Hydro's calculations.

Concerning Parallel Generation:

The government should instruct Hydro that rates paid to parallel generators should be based on the value of the power to the system as a whole (full avoided cost) and should not differentiate between the various sources of generation.

Concerning Hydro's plans to go to a "bidding" system for capacity additions from independent generators, the government should instruct Hydro that such a scheme is premature in the province and should not be advanced at this time. To gain greater experience and to develop a strong, vibrant industry in Ontario, the promotion of independent generation would be better served in the short term (1988 - 93) by simple, clear, standard offer contracts paying full avoided cost for power.

As such, the government should instruct Hydro to immediately move to establish standard contracts for all parallel generation projects regardless of size.

Concerning Demand Management:

To gain a better appreciation of the potential for demand management, Hydro should immediately develop, in conjunction with industry and government, sophisticated supply curves for demand management. The government should instruct Hydro to have such supply curves prepared by early spring, 1989.

In general, ratepayers are less interested in how their power is generated than they are in the services that power provides. As such, the government should instruct Hydro to pre-occupy itself less with building supply options to meet projected forecast electricity demand, and more with providing efficient delivery of energy services. A greater committment to the latter would involve the development and use of highly sophisticated end-use forecasting models to narrow the range of uncertainty in Hydro's projections about future electricity demand.

Concerning Demand Management Continued:

To the extent that the new market for electricity is in unnecessary heat applications (such as space and water heating) where other energy sources provide the service more efficiently, the government should instruct Hydro to de-market the use of electricity. Not electrically heating a new home in the first place will reduce the need for new electric generation capacity more effectively than attempting to retrofit a dwelling to efficient operation after the fact.

To encourage maximum demand management in all sectors of the Ontario economy, the government should instruct Hydro to offer higher incentive levels. All demand management initiatives that can be provided at or less than the full avoided cost of power should immediately be funded.

Most demand management investments have physical lives of twenty years. As such, when comparing options, the government should immediately instruct Hydro to write off demand management initiatives over 20 years rather than Hydro's intended 5 year write off.

Concerning Nuclear:

Notwithstanding any degree of consensus concerning the potential future costs of energy from CANDU nuclear technology, uncertainty, and the possibility of the unexpected, remain an ongoing fact of life. As such, the government should instruct Hydro to plan for the unexpected by generating a series of "what if" sensitivity scenarios as part of a provincial contingency for unplanned future eventualities. Based on historical experience and market realities, these sensitivities should include:

- a shorter than 40 year life for a nuclear plant (suggest runs at 30 and 35 years)
- a higher discount rate than 4% real (suggest 6% real)
- a lower capacity factor than 80% (suggest 70% and 75%)
- major new capital expenditures (O&M) during the life of the nuclear facility (use historical data)
- higher overall capital costs than the Darlington facility (suggest 10%, 15%, and 20%)

To properly assess their impact, the government should instruct Hydro to run these sensitivities both individually and cumulatively.

Concerning Nuclear Continued:

To avoid the appearance that the extent to which Hydro has become a nuclear utility with large numbers of nuclear staff biases the utility toward the nuclear option, Hydro should deal with the question of ongoing meaningful employment for Hydro staff working in nuclear engineering and plant design seperately from the issue of nuclear as a cost effective, reliable source of electricity. Should the nuclear option not be maintained, Hydro should have a contingency plan involving potential retraining and/or early retirement for these staff. The government should instruct Hydro to develop such a plan.

Based on the testimony of witnesses that Hydro is not planning to take full advantage of demand management and parallel generation potential, the government should indicate to Hydro that these options are to be fully and aggressively pursued and exhausted prior to any decision being taken on whether and when other major capital additions are required.

The government should further instruct Hydro that the assessment as to whether demand management and parallel generation options have been "aggressively pursued and exhausted" will be the responsibility of the Ontario Energy Board.

FACT/SUMMARY SHEET

FACT: Ontario Hydro's installed dependable peak capacity is 30,080 MW (Hydro's 1987 annual report).

FACT: Ontario's peak demand on August 4, 1988 (summer heatwave) was 19,502 MW.

FACT: The forecast peak demand for winter 88/89 is 23,200 MW. (Ontario Hydro presentation to Committee 1591A)

FACT: With the commissioning of the Darlington nuclear station, Hydro's capacity increases by 3500 MW.

FACT: There are 10,000 MW of technical potential gas cogeneration in Ontario (Acres). At 3.8 cents/kWh, 1350 MW of this potential would be implemented. At 6.0 cents/kWh, 2850 MW of this potential would be implemented (Diener). The potential for institutional/commercial cogeneration has not yet been seriously investigated.

FACT: There is an anticipated 9000 MW of demand management potential in Ontario available by the year 2002 at 5.0 cents/kWh or less (Marbek/Torrie).

FACT: Mothballed capacity which could be fired for short term requirements (but which Hydro says is too expensive) totals 2100 MW.

SUMMARY:

Ontario does not need major new central generation capacity additions after Darlington if other options (efficiency, parallel generation, repowering) are pursued as an aggressive priority.

These non-central generation options:

- are more cost effective, saving ratepayers money
- are more environmentally sensitive
- create jobs in the communities where people live
- diversify Ontario's electric generation base (approximately 60% nuclear)
- increase the flexibility of the Ontario Hydro system (more small plants rather than few large ones)
- reduce the required utility reserve margin thus saving capital.

Section One

PROCESS

Introduction

The following strategic principles relate to the question of "process" in determining Ontario's future electric demand/supply options.

2.5 Consultation with customers, the public, governments and the legislature will continue to be an integral part of the planning process.

3.10 Ontario Hydro will work with governments, industry and customers towards developing standards for buildings, appliances, etc. including the highest electrical energy efficiencies that are widely acceptable.

3.11 Ontario Hydro will identify other barriers to increased efficiency and work with other parties as appropriate towards the reduction or elimination of such barriers.

5.2.1 Ontario Hydro will seek improvements to the planning approval process to provide increased flexibility.

Discussion

It is no accident that a discussion of how Hydro proceeds to make its plans for the future of Ontario's electricity demand and supply is the first section of this document. For while Hydro claims to have sought considerable outside input, numerous key witnesses testified that they were not consulted by Hydro and that they do not agree with the utility's assumptions and conclusions.

While those not consulted included individuals and groups from both the demand management and parallel generation industries (eg., wind priced by Hydro at $7500/Kw whereas commercial installations are being completed in Canada today for $1800 - 2000/Kw), the two most outstanding examples of a) non-consultation, and
b) direct contradiction of input

occur in the

a) prescreening out of the gas option, and
b) disregard of stated Ministry of Energy policy.

A) On gas pricing, Hydro uses a forecasted 1988 figure of $5.08/MMBTU.

Yet it was stated by the Ontario Natural Gas Association (ONGA), Consumers Gas and independent Alberta gas producers (AEG Oil & Gas Co. and Sceptre Resources) that they were unaware of how Hydro had derived this figure and that delivered gas to-day is in the range of $2.90/MMBTU.

While, as a result of the hearings, Hydro acknowledged that its $5.08 figure is out of date, this is the number which permitted the utility to eliminate gas as "not a cost effective" option. It is not clear at this point how, or whether, Hydro plans to revise its strategy to take the reality of the cheaper gas option into account.

Similarly, Hydro's concerns about long term gas reliability were answered by the offer of long term contracts from suppliers.

Clearly, Hydro must re-work its assumptions concerning the role of gas in Ontario's electric generation future. Gas is a serious option. Hydro needs to consider it in this light.

B) Concerning the Ontario Ministry of Energy, Hydro disregards stated Ministry policy as expressed both in its review of the draft DSPS and in its presentation to the Committee.

In particular the Ministry states that

> "rates paid to independent generators should fully reflect the value of the power to the system and should not differentiate between different sources of generation." (pg.v)

Hydro differentiates between sources of generation by offering a preferential levelized rate to renewable energy technologies.

Similarly, the Ministry states that

> "the source of the resource should be a secondary consideration particularly with regard to favouring indigenous Ontario sources over other Canadian sources." (pg.vi)

Hydro explicitly states a preference for indigenous resources and develops electric generation planning on the basis of this preference.

Finally, the Ministry states (see presentation to the Committee) that all contracts, including those over 5 MW, should be <u>standardized</u>.

Hydro continues to <u>negotiate</u> contracts over 5 MW on a project by project basis.

While there are other examples of either non-consultation or direct disregard for input, the above serves to illustrate the point that in the current context, that is, with Ontario Hydro performing as rule maker, referee and player, dialogue is, for the most part, a one-way street.

There is an additional concern involving process. Whereas in the above examples the gas industry and the Ontario Ministry of Energy are reasonably well informed, seldom, if ever, are customers, the public and even some political leaders sufficiently well informed and well prepared to comment on Hydro's plans for the future of electric generation. This is especially the case where Hydro costing analysis is concerned.

What the public and government do know is that Ontario Hydro's service is reliable. As such, the erroneous conclusion is often reached that Hydro should be left on its own to do what it knows and does best. But Hydro's reliability as a distributor of electric power is not at issue here.

At issue is how that power is to be generated (or saved) prior to distribution. At issue are the options among which we have been asked to choose. In fact, at issue is whether ratepayers have been objectively offered all the available options.

Pre-Screening Options:

The situation upon which Ontario ratepayers and taxpayers have been asked to comment (the DSPS) is akin to taking a child shopping for shoes. To speed up what could be a painful and lengthly process, the smart parent has pre-selected three pairs of shoes from which the child may select. With luck, the child cooperates.

But what if that child happens to glance sideways and see a preferred fourth pair of shoes that had previously been pre-selected "out"? Typically, great discussion follows as parent trys to defend the pre-screening process and convince child that the original three pair are more practical, less expensive, better fitting. The parent has a vested interest in protecting yesterday's decision that all but the original selection were eliminated for legitimate reasons.

The child is not persuaded. Time passes, the exercise takes longer than anticipated, parent wants to get on to the next item on the agenda and, despite the fact that the child has to wear the shoes, the parent, who is paying the bill, makes the ultimate decision. The child's preference will likely not prevail.

But in the case of Ontario Hydro and Ontario's electricity options, not only is the child wearing the shoes (the ratepayer has to live with whatever decision Hydro makes), the ratepayer is also footing the bill.

In these Select Committee Hearings just concluded, many witnesses have taken that "sideways glance". Hydro's definition of the options was challenged, Hydro's economic analysis was challenged, Hydro's motives were challenged.

Though many witnesses were not able to come up with the answers, they were able to ask some significant and sophisticated questions. They have decided that options which have been pre-screened "out" need to be re-included.

But they do not want the resolution of their questions to be left up to Ontario Hydro. They want an independent body with financial resources and legislative authority to act as a third part arbiter. This body would not only comment on and approve, modify or reject Hydro's planning, it would act to resolve policy disagreements should they arise between Hydro and the promotors of demand management or parallel generation initiatives. Through the institution of such a body, Hydro's credibility would be enhanced.

Those witnesses suggesting an ongoing independent technical review body such as the Ontario Energy Board include:

- The Technical Review Panel
- Prof. John Robinson, University of Waterloo
- Enserve Financial Corporation
- Tom Brett, Lawyer, Johnston & Buchan
- Marbek Resource Consultants
- Steve Diener, Consultant
- Energy Probe
- Steve J. Haberl, Vice President, Sceptre Resources
- Bernie Jones, Blue Apple Consulting Inc.
- Independent Power Producers' Association
- JBS Energy Inc.
- Ontario Natural Gas Association (ONGA)
- Multistream Power Corporation
- Helene Connor-Lajambe Ph.D.

This body must have real human and financial resources and authority or it will not accomplish its goal. A body without authority will, as James Litchfield, Director of Planning for the Northwest Power Planning Council stated before the Committee, "become shrill in order to get attention". This is, in fact, what has happened to the Ontario Energy Board in its current role vis a vis Ontario Hydro.

But there is an additional reason this (OEB) review body has to have legislative authority. To date, independent generators who are publicly critical of Hydro policy remain concerned about the fact that

- their input will be ignored,
- they will be penalized by Hydro in future contract negotiations.
- Hydro will change the rules of the game as it is being played.

Conclusion

Based on the concerns raised by witnesses during the hearings, the DSPS does not provide an appropriate framework to priorize and screen Ontario's future demand/supply options?

Suggested Recommendations

To achieve maximum consensus, Hydro should engage in as much public consultation as it deems necessary and advisable prior to presenting its demand/supply plans for approval, alteration or rejection to a binding decision making body that is outside and independent of Ontario Hydro. Said body must be given, by the government of Ontario, the human, financial and legislative authority to fulfill its duties.

Hydro must revisit its analysis of the various resource options (both supply and demand) prior to proceeding to an identification of possible alternative plans.

Section Two

EQUITABLE COMPARISON OF THE OPTIONS

Introduction

The DSPS represents a milestone stage in Ontario Hydro's planning for the late 1990's and beyond. Significant investigation and research was undertaken in order to develop the 52 strategic principles, and to "support them". (DSPS pg.14-1) During its presentation to the Select Committee, Ontario Hydro used this material to justify and define the application and meaning of the strategic principles. (Transcripts, August 3-11). The DSPS is a critical evaluation stage in the Ontario Hydro Planning process.

Yet after expert witnesses and intervenors questioned various assumptions implicit in the DSPS concerning resource availability, potential and costs of various options, Ontario Hydro stated that the strategy was flexible, was "durable", wasn't time specific, and that all options would be re-evaluated at the definitive plan stage.

However, in the consultant's view, it is clear that much of the preparatory work for the DSPS, including the Demand/Supply Options Study (DSOS) and the representative plans investigations require reworking before realistic definitive plans can be developed. It is also important that the Committee recommend changes in the economic evaluation framework, which can provide realistic comparable data, and assist in developing consensus for choosing new demand and supply options. In addition, the Committee might wish to address a variety of costs which are not included in the evaluation.

Discussion - Measures of Cost

The following strategic principles, including Ontario Hydro discussion, are identified for the Committee's consideration.

2.1.1 Ontario Hydro will aim to develop a mix of demand and supply options that provides electricity service to customers at lowest total customer cost.

2.1.2 The cost of meeting social and environmental requirements will be included in cost evaluations of demand/supply options.

These strategy elements are a follow on to general strategic principle 1.3 - "low customer cost is vital." The following quotation defines how Ontario Hydro measures cost:

> "For supply options, the appropriate costs include all the costs that are incurred by Ontario Hydro to produce and deliver the electricity used by customers ... (For demand options) the costs to customers include direct expenditures by them for goods and services (eg. the cost of an electrical appliance) and also the costs incurred by Ontario Hydro and the municipal utilities to provide the electricity." (DSPS pg.11-4)

As further clarification of the measures of cost, Hydro states that provincial economic effects should not be a primary factor in Hydro decision making. Low cost, reliability, and environmental soundness are considered to be of greater importance.

In addition, Hydro states that "a large part of the social and environmental costs of demand and supply options are included in the costs evaluated."(DSPS pg.11-5) Environmental costs are defined as the price of meeting government set environmental standards, while community impact agreements meant to mitigate the impact on municipal infrastructure due to the development of central generation facilities are given as an example of social costs.

Inclusion of Environmental Social and Fiscal Costs

The various options have different environmental, social and fiscal cost implications. Hydro discusses this issue most succinctly in DSPS Section 11.2.1.

The consultants believe that a further clarification of Strategy Element 2.1 is necessary, in order that Ontario Hydro internalize benefits that are not explicitly delineated in the cost calculations.

For example, government set environmental regulations are minimum standards. Ontario Hydro's interpretation of appropriate environmental costs potentially limits the development of slightly more costly portions of an options portfolio which may have substantial environmental benefits (i.e. demand management, industrial cogeneration). While difficult to quantify, these benefits are of obvious value.

Likewise, social costs and benefits are also narrowly defined by Ontario Hydro. While the cost of social impact agreements is taken into account, other social impacts such as transmission line development and employment "boom and bust" cycles should be considered.

An attempt should also be made to level the playing field, whereby all options are compared under equitable tax and financing rules. Ontario Hydro recognized this factor to some extent with its "standard cost" method, but due to a number of other factors included in the model (transmission, distribution and additional system energy costs), it was difficult to appreciate the impact.

Evaluation Methods

A number of intervenors and expert witnesses discussed Ontario Hydro's economic evaluation methods. The standard cost method used for initial screening of the options was described as "unique to Ontario Hydro" (Marcus), "almost useless" (Litchfield), "not a very commendable method" (Lajambe) and "unintelligible" (Jones).

The Committee was presented with a wide variance of information concerning costs and resource availability. While Ontario Hydro has undertaken considerable investigation in the comparison of option economics, it was difficult to establish a common basis for comparison, since both the representative plans and standard cost analysis were encumbered with considerable system impact data. The consultants believe that while this analysis is relevant, simple levelized unit energy cost evaluations (examining options on a stand alone basis) are also an important part of the consideration.

Such a simple levelized unit energy cost evaluation takes into account

- Capital (including such items as financing, construction, depreciation, decommissioning)
- Operations and maintenance
- fuel

for single units without simulating the impact on the forecasted system.

In addition, basic assumptions about peak and energy contributions of various options, as well as capital cost, fuel and operations assumptions should be a principle part of public consultation. Also, multi-faceted sensitivity tests must be part of this process. An example from Marcus demonstrates why. The Committee will recall that Ontario Hydro found combined cycle generation to be three times as expensive as nuclear generation in its base case.

However by being somewhat less bullish about the assumptions than is Hydro (i.e., looking at the historical record rather than conjecture about greatly improved future performance), "the nuclear cost advantage is erased" and combined cycle generation comes out cheaper. (Marcus pg.53)

Rather than presenting, and ultimately defending its choice of assumptions about discount rates, capital costs, capacity factors, life expectancy, and fuel prices, Ontario Hydro should involve industry groups and consultants in an open process of investigating the cost and system impacts of various options. Such a process would not only assist in providing the most up-to-date information, as shown in other jurisdictions, it can assist in building consensus.

Using the differences among the representative plans and standard costs as the basis for strategic principles for future planning may not be warranted given the inconsequential economic differences among plans.

While Hydro attempts to suggest definitive forecasts about the nuclear option, it is in fact not possible to make definitive forecasts about resource availability and costs for <u>any</u> option.

What is clear is that Ontario has a wealth of demand and supply options to choose from - many of which go beyond those enumerated in the DSPS. Given the information presented to the Committee, the available information from Ontario Hydro, and the relatively minor differences in costs among options (well within the margin of error over a twenty five year simulation period), the consultants strongly believe that this province has the opportunity to choose which among these options will be implemented.

Changes to Strategic Principles

In order to take the above discussion into account, we recommend the following changes:

2.1.1 Ontario Hydro will aim to develop a mix of demand and supply options that provides electricity service to customers <u>at the lowest total cost to society</u>.

2.1.2 A <u>credit</u> for social and environmental <u>benefits</u> will be included in cost evaluations of <u>demand management and parallel generation</u> options.

Suggested Recommendation:

In comparing resource costs and availability, Ontario Hydro should alter its economic evaluation procedure to provide realistic comparable data. The process could be simplified by including simple levelized unit energy cost evaluations as part of its assessment analysis.

Section Three

LEAST RISK PLANNING

Introduction

There is a wide variance of opinion as presented by witnesses concerning load forecasts, need dates for new capacity, and Ontario Hydro's approach to least risk planning.

Discussion

The consultants agree with the evidence presented by AMPCO and others, that the costs of capacity shortfalls would be greater than the cost of overcapacity. However, this assessment falls short. Given the Ministry of Energy's Supply Curves study (Marbek) on the potential for demand management, given various assessments concerning the availability of independent generation, and given mothballed Ontario Hydro plants, it is evident that considerable short to medium term resource availability exists.

It is unfortunate that Ontario Hydro did not act on the previous Select Committee recommendation number 10:

> The Government should direct Ontario Hydro to initiate, as part of its resource plan, three large scale technical and market demonstration programs for conservation, up to $25 million each, in each sector (residential, commercial and industrial).

Such an action would, by now, have demonstrated demand management's availability. Instead, we are currently in the position where evidence presented by Ontario Hydro focusses on what is termed as "realistic planning expectations" for demand management.

Hydro argues that for economic reasons it is prudent not to proceed aggressively with demand management until an identified later need date and that in any case, program experience is necessary before maximum implementation can be undertaken.

The consultants believe that most demand management and parallel generation technology is readily available and proven. We feel that Ontario Hydro's plan to delay full scale implementation of strategic conservation until the identified need date for new capacity fails to confront the risk of capacity shortfalls and fails to recognize the need for an adjustment/adaptation period prior to full scale user understanding and acceptance of demand management initiatives. The sector cannot be called upon at the last minute to deliver on the need date. Also, as written, the strategic principles could provide the basis for committing new, unneeded central generation facilities in the short-term.

Ontario Hydro has been reviewing independent generation economics based on a need date for new capacity in 2002 and stresses the importance of considerable testing of both demand management and parallel generation programs before widespread implementation.

Numerous witnesses argued over the demand management and parallel generation resource potential. But rather than debating the numbers which, with Hydro as the policy and implementation vehicle are barely curiosities, the consultants believe that to prove delivery capability, full scale implementation of parallel generation and demand management should begin now.

The consultants are concerned that Ontario Hydro's Plan for Electricity Conservation & Efficiency Measures: Response to the Honourable Robert Wong Minister of Energy is primarily based on natural conservation for a large part of the short term gains in demand management.

The following table indicates Ontario Hydro projections by sector, both in terms of natural (information driven) and strategic conservation up to 1993:

Megawatt Reduction Targets

	In 1989	By 1990	By 1993
RESIDENTIAL			
Natural	3	6	20
Incentive	3	8	37
COMMERCIAL			
Natural	45	90	225
Incentive	6	22	76
INDUSTRIAL			
Natural	28	58	143
Incentive	5	15	70
TOTAL			
Natural	76	154	388
Incentive	14	45	183
TOTAL DEMAND MANAGEMENT (MW)	90	199	571
% Natural	84.4%	77.4%	68.0%
% Incentive	15.6%	22.6%	32.0%

Note: Figures do not include independent generation or load shifting

In addition, most of the contingency planning in the representative plans is based on planning and engineering central generation facilities, particularly nuclear, in advance of commitment decisions. With Ontario Hydro's present accounting approach, these costs would not immediately be part of the rate base, while demand management and independent generation costs would be treated as current costs.

Though correct from an accounting standpoint, this treatment does not take into account actual expenditures and results in a bias against demand management and parallel generation.

Changes to Strategic Principles

Strategy Elements 2.2.2, 2.2.3, 2.3, 3.5.1 and 5.3 all deal with the issues of flexibility, risk and timing.

The consultants feel strongly that resource smoothing (2.3), if an issue at all, should more correctly be under the purview of government. There is a definite "overcapacity" situation in hydraulic turbine manufacturing capability in Ontario at this time, and little evidence that industry could not capably and cost-effectively handle any Ontario Hydro requirements. As such we feel strategy element 2.3 should be eliminated.

Strategy element 2.2.3 sets out the importance of "contingency plans". We suggest the Committee instruct Ontario Hydro to prepare more extensive contingency plans than those used in the representative plans analysis. Most of the evidence presented to the Committee, dealt simply with planning and engineering long-lead time central generation facilities.

Finally, we suggest the following changes to strategic principles 2.2.3, 3.5.1 and 5.3:

2.2.3 Demand options will be implemented <u>well in advance of the most likely need date</u>, and supply options will be committed, in time to meet the most likely load growth economically and reliably.

3.5.1 Development and implementation of economic demand reduction programs should be <u>the highest priority</u>.

5.3 Single or two unit commitment of economically sized units in multi-unit stations will be considered to maintain flexibility. <u>The increased costs of single or two unit commitment will be taken into account when determining the value of strategic conservation and independent generation.</u>

The Technical Advisory Panel report provides a further basis for discussion of risks and cost (see pgs.41 - 45) and recommends that "Ontario Hydro develop methods for determining the cost-effectiveness of resource options which incorporate the value of flexibility and the ability to manage risk."

Such methods would make all issues relating to cost (including tax issues) explicit. Only then can it be determined whether or not the "cost-effectiveness playing field" is tilted in Hydro's favour.

As such, the consultants support the above Panel recommendation.

Section Four

DEMAND MANAGEMENT - AN EXAMPLE OF IMPLEMENTATION

Introduction

Projections of demand management potential to the year 2000 ranged from approximately 4,500 MWs (Ontario Hydro - Electricity Conservation & Efficiency Measures) to between 9,000 and 13,500 MWs (Marbek, Torrie, DT pg.53).

Sections One and Two previous looked at demand management from a cost evaluation and risk mitigation perspective. This section will discuss the implementation of demand management in Ontario.

Discussion

While there were differences with regard to resource potential assessment, most presenters to the Committee agreed that pursuing electricity efficiency was a priority.

While the consultants were encouraged by Hydro's presentation of the heat pump example (Snelson, Strategy Element 3.9.3 presentation) which provided some delineation of the incentive levels Ontario Hydro would find acceptable, we believe higher incentive levels are warranted.

Perhaps due to present energy pricing, the private sector is not implementing potential savings. Marbek Resource Consultants expressed the problem this way:

> "I think there are ... a number of unreasonable tests for what constitutes an acceptable demand management program being applied at Ontario Hydro ... If we give a rebate for florescent lighting in the commercial sector, is that not discriminating against the residential sector where we are not offering that rebate?
>
> I think there is also unnecessary concern about how the benefits of demand management programs are going to be split between Ontario Hydro, the bulk power provider, and the municipal utilities that distribute it.
>
> There is a hurdle rate being applied. It is sort of a reverse hurdle rate where analysts in Hydro are saying: 'If a technology has a payback period of less than three years, it is economic for the private sector, and we should not be subsidizing it. We should only subsidize things that are over a three-year payback.' But our example of lights and our example of motors show, despite half-year paybacks, it is not happening in the marketplace. It is unrealistic to establish a principle that we are not going to subsidize something that is less than a three-year payback. It is denying the market realities. It is denying the market failures that are going on out there." (DT, Sept. 15 pg.50)

The consultants recommend that a number of demand management "limiting" strategy elements be removed from the DSPS. In addition, we feel that the way to approach strategic conservation from an economic efficiency point of view is simply to determine the value of new supply additions, and then to set out a strategy which funds all demand management initiatives that can be provided for that value (taking into account environmental and social benefits). The concept is similar to parallel generation wherein all participants in strategic conservation initiatives would be paid up to the full avoided cost of power.

The time for fine-tuning demand management programs is not during the birthing stage. Hydro should not be spending time second guessing what the short term effect on rates might be, or whether subsidization within or between rate classes is too high, or whether the new market is more important than the retrofit market.

The consultants believe Ontario Hydro is slowly re-orienting its approach to demand management, but that this re-orientation is painstaking. This Committee can have an influence on Hydro's administration of this new area of endevour by showing unequivical support for strategic conservation initiatives.

Changes to Strategic Principles

We recommend the elimination of strategy elements 3.5.2, 3.9.2 and 3.9.3 from the DSPS:

> 3.5.2 Priority should be given to influencing the new market rather than the retrofit.

It is not clear what this strategy element means. Is Hydro accepting the concept, for example, of de-marketing electric space heating in new homes? If so, it should be stated explicitly. Also, while there will be more economic advantage in the new market, there will still be many opportunities in the retrofit market. Hydro should simply pursue all justifiable opportunities.

> 3.9.2 Customers who participate and receive direct benefits should provide a substantial contribution to the cost.

While customers should be willing to contribute to the cost of demand management, Ontario Hydro should not limit its participation based on this requirement. It is not only participating customers who benefit from demand management - Hydro and all ratepayers benefit as well. (for more discussion see Passmore Issue Paper # 2 following)

3.9.3 The level of incentives should be acceptable to customers in general.

Equity among all customers is practically speaking unattainable, with or without demand management initiatives. As discussed by Hydro, the best way of addressing the customer equity question would be through a series of technology and sector specific programs. If customers don't have a need for a lighting assistance program, they could benefit from a heat pump program, for example. All customers benefit, in the long run, from "one another's" demand management programs.

Strategy element 3.9.1 should be restated as follows:

3.9.1 Incentives should be based on the cost of new supply options, taking into account the environmental and social benefits from pursuing demand management.

Suggested Recommendation:

To the extent that the new market for electricity is in unnecessary heat applications (such as space and water heating) where other energy sources provide the service more efficiently, Hydro should de-market the use of electricity. Not electrically heating a new home in the first place will reduce the need for new electric generation capacity far more effectively than attempting to retrofit a dwelling to efficient operation after the fact.

Section Five

ADDITIONAL GENERAL CONCERNS

1. DSPS is largely preoccupied with meeting energy demand (building new sources of supply), rather than providing energy services (lighting, cooling, motor operation).

   This preoccupation results in building new central plant prematurely at the expense of more cost effective options.

   It is Chairman Franklin's hope that Hydro will be able to evolve away from being "system builders". But this has not yet happened. If the Hydro "mindset" is not in accord with Mr. Franklin, can it not simply outlast him? Can Hydro's ratepayers afford to wait and see?

   Neither is it clear that Mr. Franklin himself is fully committed to a complete energy service orientation. He speaks of "even if demand management ... deliver(s) (what) we think (it) can, 1996 will be far too late to start thinking about new supply options." The chairman has not understood that if Hydro goes the whole mile in becoming a demand focussed utility, 1996 will not be too late to reassess whether we will need new supply options in the subsequent ten years.

2. DSPS has not planned for uncertainty, and is thereby unlikely to build a diverse, flexible system.

   Not only is the uncertainty range high at 26,000 MWs, Hydro states there is a 40% chance that actual load will fall outside this range (either above or below). This speaks to the need to maintain maximum flexibility. What does maximum flexibility mean in Hydro's view? Does it mean proceeding with shortest lead time projects? It does not appear so.

   Hydro further states that a utility which is 60 percent reliant on the nuclear option (i.e., Ontario Hydro) is not too highly reliant on one option. As such, Hydro offers no plan which addresses the risk of "common mode failure".

3. DSPS is not clear on how to select between options.

   If Hydro intends to select between plans, how does the utility propose balancing the trade-offs between potential conflicts. Is reliability paramount, is cost-effectiveness? If, as surveys suggest, the public is prepared to pay a premium for environmental security, does this become the primary variable?

   Should choices about how much weight to give each of these principles be made by Hydro or by the government? In the consultant's view the obvious answer is "government". Yet this is not the current situation.

4. The representative plans presented in DSPS do not constitute sufficient variation to warrant 16 alternatives. Furthermore, the variations are sufficiently insignificant as not to permit the justifiable selection of a preferred plan.

   This unfortunate situation results from having done an inadequate evaluation of the resource options which itself led to the premature elimination of certain resources (i.e., gas) that could, given proper resource evaluation, form part of more diverse, more meaningful representative plans. As stated elsewhere, in order to develop meaningful alternative plans, Hydro will have to revisit its analysis of the resources.

5. DSPS uses a 4% real discount rate.

   This is yet another mechanism for favouring capital intensive technologies. For all intents and purposes, this means nuclear projects because there are few large hydro opportunities in Ontario remaining. But such capital intensive projects tend to put strain on the capital markets and makes financing arrangements for other private sector initiatives - which show a higher rate of return (10 - 15 percent real) and for which private corporation pay taxes - more difficult.

6. DSPS is too specific in areas where Hydro has least expertise. (demand management and parallel generation)

   Because these are admittedly new areas for Ontario Hydro, the sooner Hydro gains experience with them, the more likely we are to understand the potential.

   As stated previously, Hydro needs to construct sophisticated supply curves for demand management and parallel generation. Such curves were presented to the committee by expert witnesses indicating that such professional sophistication does exist.

   In the past, Hydro has placed a low priority on developing

sophisticated long run marginal projected costs. As such, the utility is not in a position to evaluate which options (or which demand management or parallel generation alternatives) are cost effective.

7. In the consultant's view the strategic principles are too broad, too general, too open to interpretation. Hydro should re-work its strategic principles into no more than 10 precise, fully elaborated principles which should be clearly defined and priorized. These might include such elements as:

   - offering energy services as a consistent priority
   - diversification
   - favouring short lead time projects
   - concern for the environment
   - cost-effectiveness

   These principles would then be studied by the Ontario Energy Board to assess whether they fit within current government policies and priorities.

8. DSPS offers questionable commentary on the impact of demand management on the need for and cost of transmission. Hydro suggests the impact will be minimal. This seems unlikely unless Hydro's efforts in demand management are themselves minimal. (See PASSMORE Issue Paper # 6)

Section Six

POLICY NOT PROGRAMS:

Where independent power is concerned, because Ontario Hydro is not proceeding in a manner to the liking of the Ontario Ministry of Energy, the Ministry has developed a number of "encouragement" programs aimed at assisting industry to get started and then to keep going. This has been ongoing now in small hydro, for example, for about eight years.

Such programs spend public money to "demonstrate" technologies that do not need demonstrating. What is needed is a government policy directive that instructs Hydro to pay publicly acceptable full avoided costs (capital, fuel, transmission, operations, maintenance, administration, interest & inflation) on a standard offer contract basis.

In the absense of such a policy, programs are a necessary evil. But industry cannot survive on programs. Government must ask itself about the wisdom of spending public funds to "support" an industry for which it has no intention of creating a situation where market forces eventually prevail. If the government is not serious, industry wants to know. Then it can get on with the business of doing something else.

Note that it is only once the system is market driven that many of the uncertainties about potential, delivery capability, project financing and reliability will be answered.

Policy Considerations

Options should be selected on the basis of their ability to meet certain policy goals as established by government. Such government goals could include:

- building lead time flexibility into the provincial electric system
- ensuring reliability of diverse supply and demand options
- stimulating economic activity particularly in small business

Let's look at some of the options with these policy considerations in mind.

Timing Flexibility:

Demand Management	-	One Year and Beyond
Parallel Generation	-	Two Years and Beyond
Natural Gas	-	Two years and beyond
Large Central	-	Ten Years and Beyond

Note: Risk of error increases with response time.
Also note the increasing reliance on one technology and the resultant possibility of commom mode failure (nuclear).

The Potential/Reliability:

	DSPS	Other
Demand Management	3500 MWs	7000 MWs
Parallel Generation	1000 MWs	3500 MWs

Who do we believe? It depends on what the rules of the game are. Given the current rules, Hydro's estimates could be too high. Change the rules and "other" estimate could well be too low.

There is a preoccupation with trying to second guess the numbers.

Decision/policy makers have an opportunity to choose the future. The various options have proven delivery capability and reliability in other jurisdictions. In Ontario, the barriers to widespread deployment of certain options are the current rules.

Hydro is simultaneously the rule maker, the player and the referee.

- Government should be the rule maker
- Hydro should be one of many players (generation only)
- OEB should be the referee

What if the barriers to demand management are removed and response falls short?

Under the DSPS "plan", by the time we know, it could be too late.

That's why you compliment a demand management strategy with short lead time projects.

Ontario needs to start to create a more active demand management and parallel generation industry now. WHY?

- to create an industrial sector ready to respond when asked to
- to give said sector an opportunity to prove delivery capability
- to permit time for public (and political) confidence to grow

Note: More potential exists in demand management than in parallel generation (and at less cost). Among parallel generators, the most potential lies with cogeneration (both gas and wood fired), followed by small hydro. Wind power will have applications in remote regions of the province where wind regimes are favourable.

Stimulate Economic Activity/Financing:

It is possible to create a new independent generation industry in Ontario.

What level of investment would be required? Perhaps as much as $ 4 - $ 6 billion providing approximately 3000 MW (if needed) by the year 2000.

Where will the money come from?

- internal industry revenue
- insurance industry
- pension funds
- conventional lenders
- off-shore investment
- lease financing
- venture capitalists

The Window of Opportunity is small and shrinking.

- long term gas contracts are being signed with others (notably U.S. customers)
- need to prove delivery capability, reliability before need arises (ie: need strong industry up and running well by 1992)

Is Hydro the best body to judge demand management or parallel generation potential?

- they have very little experience in these areas
- they are unfamiliar with private sector economics
- historically, the institution has not been committed. The lead time to become committed (if this is possible) will be too slow and we will lose our window.

A Problem Brewing:

A potential problem is brewing. The gap between what the demand management and parallel generation analysts say is attainable, and what Hydro suggests it will or can do, is growing.

Witnesses suggest the solution in the form of an independent third party arbiter. If Hydro is confident in its position, it should have no difficulty defending that position under scrutiny. Lack of such independent arbitration will lead to a breakdown of consensus about the future of electric generation planning in Ontario.

Governments should not underestimate the urgency of resolving this growing difference of opinion.

PASSMORE ASSOCIATES ISSUE PAPERS

These issue papers were prepared and submitted to Committee members during the course of the Hearings.

They are re-submitted here with minor modifications for convenience.

PASSMORE ASSOCIATES Issue Paper # 1

ALTERNATIVE DEMAND/SUPPLY STRATEGIES
General Demand/Supply Strategies
Measures of Cost

ONTARIO HYDRO'S STRATEGY ELEMENTS

2.1.1 Ontario Hydro will aim to develop a mix of demand and supply options that provides electricity service to customers at lowest total customer cost.

2.1.2 The cost of meeting social and environmental requirements will be included in cost evaluations of demand/supply options.

Discussion

DISCOUNT RATE

- Capital is a finite resource. Demand for capital effects the price and availability of both debt and equity.

    - two issues were discussed by witnesses. First. that Hydro's estimated cost appears low when compared to present day costs of capital. A 4% "real" discount rate (interest rate - inflation) is comparable to money being available to Hydro at between 8 - 8.5%. Second. that this lower interest doesn't reflect government and consumer costs. See Marcus (JBS Energy Inc.) presentation to the Committee which discusses Ontario Energy Board concerns. and other jurisdictions treatment of this issue.

- a 4 % discount rate favours capital expenditures over less capital intensive options.

COST ESTIMATIONS

- Several witnesses questioned Ontario Hydro's cost estimates for various technologies and fuels. In addition. the witnesses indicated that very little consultation had taken place during the preparation of these estimates.

- Hydro has very little experience with several demand and supply options.

  There were several examples of this:
    - in the DSPS Hydro costed wind turbines at $2.500/kW. while in the presentation to the Committee a figure of $7.500/kW was quoted.

    - Natural Gas was estimated to cost over $5.00/mmbtu while witnesses discussed prices of less than $3.00 being available.

- Clean coal technology (Integrated Gasification/ Combined Cycle). was estimated by the Ministry's consultant Stone & Webster. as $980 (multi unit)- $1880 (single unit)/kW while the DSOS presented a cost of $1970/kW (single unit). This Ontario Hydro figure did not include Interest During Construction Costs (S&W's did) which would raise the estimate by a further 15-20%.

As discussed by Marcus. these estimates are critical to the selection of the most cost-effective mix of demand and supply options. Using the Ministry of Energy's natural gas fuel price forecasts. a 6% real discount rate. and nuclear costs based on the Darlington experience. a combined cycle gas station becomes marginally more cost-effective than a new nuclear plant. Yet Hydro's analysis shows the nuclear option as almost two and a half times more economic.

NATURAL GAS

- A copy of Hydro's letter concerning natural gas price estimates is appended.

ontario hydro

700 University Avenue, Toronto, Ontario M5G 1X6

July 27, 1988

OUR FILE: 104.12SC.1

Mr. D. Argue
Passmore Associates International
135 York St.
Suite 209
Ottawa, Ontario
K1N 5T4

Dear Mr. Argue:

Natural Gas Costs

Yesterday you asked for some natural gas prices and forecasts in $/Btu, consistent with the fuel prices of Report BESR 8702, and why the escalation rates vary with the scenario.

Below are natural gas prices on a $/Btu basis (dollars of the year) and escalation rates for years after 1990. These data were available around the time that the financial evaluation of BESR 8702 was done. We only have the data on gas for the most likely growth case.

Delivery Prices of Natural Gas

Year	$Cdn/10^{6}Btu
1985	4.42
1986	4.54
1987	4.76
1988	5.08
1989	5.47
1990	5.90
1991-1995	8.5% p.a.
1996-2000	10.5% p.a.
2001-2005	8.5% p.a.

In the table of fuel prices of BESR 8702, the escalation rates vary with the growth case. The reason is that the growth cases result from different economic scenarios, including different levels of inflation in each scenario.

Other Questions

Concerning your question on standard costing, I'll have a response sent to you tomorrow.

I am still tracking down the reference to the overhead on capacity costs and assumptions.

Another set of reference reports has been sent via overnight courier. They should arrive tomorrow.

Yours truly,

Brian Dalziel

B.P. Dalziel
Planning Engineer
System Planning Division

BPD:lmf

PASSMORE ASSOCIATES Issue Paper # 2

DEMAND MANAGEMENT

ONTARIO HYDRO'S STRATEGY ELEMENTS

3.1 Demand reducing options will be pursued to the full extent they are economic compared to the available supply options in the relevant planning period.

3.2.1 Demand management programs aimed at shifting demand from peak to off-peak times will be selected to respect system limits on the usefulness of load shifting.

3.2.2 The choice between load shifting and energy storage will reflect the costs and benefits of each option.

3.3 Demand programs aimed at increasing demand will be pursued where they provide benefits to customers in total.

3.4 The planning and implementation of demand management options will be undertaken in close cooperation with the municipal utilities.

3.5.1 Development and implementation of economic demand reduction programs should be started early enough to be effective in contributing to the most cost effective demand/supply balance.

3.5.2 Priority should be given to influencing the new market rather than the retrofit.

3.6.1 Technical research and market development to support existing and planned demand management programs will be given a high priority so that demand options can be efficiently implemented in a timely manner.

3.6.2 To provide flexibility, technical research and market demonstration programs shall be undertaken to provide information on the potential for new demand management programs.

3.7 Education, information dissemination, audits, and advertising will be pursued to make customers aware of the opportunities for the efficient and effective use of electricity.

3.8.1 General rates will be based on average costs.

3.8.2 Rates may be time differentiated to give incentives to shift load to off-peak periods.

3.8.3 Special rates for non-standard conditions of service may be implemented to manage demand for specific purposes.

3.8.4 Special rates should recover at least the additional cost of supplying the electricity sold under these rates.

3.9.1 Incentives should be high enough to encourage the development of a large part of the potential that is beneficial to customers in total.

3.9.2 Customers who participate and receive direct benefits should provide a substantial contribution to the cost.

3.9.3 The level of incentives should be acceptable to customers in general.

3.9.4 Financial incentives should be based on lifetime benefits; loans and grants may be used to increase the return to customers in early years.

3.10 Ontario Hydro will work with governments, industry and customers towards developing standards for buildings, appliances, etc. including the highest electrical energy efficiencies that are widely acceptable.

3.11 Ontario Hydro will identify other barriers to increased efficiency and work with other parties as appropriate towards the reduction or elimination of such barriers.

Discussion

- Hydro was only able to offer minimal background concerning possible strategic conservation programs, or to break down the potential by residential, commercial and industrial sectors. Both elements are crucial to the determination of economically feasible demand management potential.

- Hydro should be asked to discuss the Marbek Study (Supply Curves prepared for the Ministry of Energy) which shows twice the potential for demand management in Ontario.

- The utility is also presenting strategic principles that are far more specific than those dealing with preferred supply options (nuclear).

- Hydro intends to apply a number of limiting economic evaluation criteria to their structuring of programs, even though this will raise the level of non-participation. In particular, strategy element 3.9.2. "Customers who participate and receive direct benefits should provide a substantial contribution to the cost", will inhibit a number of groups including apartment dwellers and low income ratepayers. If demand and supply options are to be treated equally, total utility costs would be a more equitable evaluation and implementation criteria. Witnesses (Marcus, Litchfield and Robinson) suggested that perhaps 70% of the purchases of electrical appliances were made by people (builders, landlords, etc.) who

ultimately don't pay the electricity bills. While, non-participants costs were given less priority in the presentations to this Committee than in the actual DSPS document, this appears to be Hydro's principle justification for believing that customers should make a substantial contribution to the cost. While other reasons (customer investment, responsibility and care) were also indicated, this element means that in the absence of customer contributions, more expensive Ontario supply options will be built.

- Hydro stressed the importance of being cautious in introducing demand management due to the need to develop and test programs, and because of the use of new and unproven technologies. Substantial information already exists on U.S. utility experience in program structuring, and most of the demand management technologies (insulation, efficient appliances and motors, etc.) have been around for some time. While not directly stated, Hydro's accounting treatment of demand management and surplus capacity (now and particularly after the addition of Darlington) are probably the most important reasons for Hydro's "go-slow" approach.

- Hydro intends to write-off investments in demand management over five years, which raises costs particularly in the early years of the program. By comparison, nuclear investments are written off over 40 years. While hydro recognizes that most of the demand management investments have physical lives of about twenty years, they argue that many of the technologies are unproven. In the consultant's view, technologies that are proven and well known (by far the majority) should be written off over 20 years.

PASSMORE ASSOCIATES Issue Paper # 3

FORECASTING/UNCERTAINTY
Response to Uncertain Growth

ONTARIO HYDRO'S STRATEGY ELEMENTS

2.2.1 The load forecast will include upper and lower projections that cover a reasonable range of possible outcomes.

2.2.2 Contingency plans must be prepared that identify practical options to respond to upper and lower load projections.

2.2.3 Demand options will be implemented. and supply options will be committed. in time to meet the most likely load growth economically and reliably.

Discussion

There is a need for flexibility to respond to "uncertainties about the future."

- 60% chance that load will fall between low and high growth range.

- 50% chance growth will exceed most likely forecast.

- "Although early developmental work may be justified. it is unlikely that actual implementation of demand options or construction of new supply facilities could be justified on any load higher than the most probable. The developmental activities only represent a small part of the cost of an option while. once construction is started. the expenditures grow rapidly and delay or cancellation becomes increasingly expensive."

ISSUES

- why such high uncertainty in load forecasting? (Due to past mistakes and minimal understanding of demand management?)

- won't start serious implementation of strategic conservation programs until need date (between 1996 - 2002). Most of the early (before 1996) demand management gains can be derived from natural conservation. with limited demonstration and testing of strategic programs.

- Hydro's central response to potentially higher growth is to proceed with design work for central generation facilities for all cases (several hundred million dollars for 4 x 881 nuclear facility).

- demand and efficiency programs. as well as independent generation are new areas for Ontario Hydro.

- need to start now to get a better understanding of how much potential there is.

- once planning starts for central facility, it is hard to stop.

- costs for Ontario Hydro's suggested demand management programs are minimal when balanced against central facilities planning and design costs except that the costs will be charged to the rate base as they are incurred, rather than capitalized in the case of Hydro supply options.

- John Robinson, Helene Conner-Lajambe, Marbek and the Technical Advisory Panel suggested that Hydro should refine and invest more effort into the development of better end-use forecasting models. They suggested that these models, as indicated by experience in other jurisdictions, would narrow the range of uncertainty in Hydro's projections.

- There were also suggestions that immediate and aggressive demand management would narrow the forecasting band-width between the low and high projections, due to a greater understanding of customer end-use.

PASSMORE ASSOCIATES Issue Paper # 4

AVOIDED COST AND POWER PURCHASE RATES

ONTARIO HYDRO'S STRATEGY ELEMENTS

4.1 Rates for purchasing power from independent generators and incentives for independent generation projects shall be up to the avoided cost to the system as a whole.

4.2 Rates and incentives for independent generation may vary because avoided cost depends on many factors. including the reliability. timing and location of the deliveries.

Discussion

As in demand management. Hydro has provided more specific comment on their approach to independent generation than for other demand and supply option strategy elements. In fact. the strategy goes into the type of detail that normally would be part of a plan.

During the last three weeks there has been considerable discussion concerning whether Hydro's rates were based on full avoided cost.

In addition there were concerns expressed about moving to a bidding system prematurely.

Summary of Present Rates

For parallel generators providing energy at greater than 65% capacity factors. Ontario Hydro's purchase rates are based on 85% of the wholesale cost of power.

Two basic rates are offered. although there are five derivations of the "wholesale cost standard". The 4.94 cents/kWh rate is a levelized rate which doesn't escalate for the ten year duration of the contract. In theory it is available to renewable and indigenous fueled technologies although the industry has had difficulty in gaining access to this offer. The other basic rate is an escalating rate. tied to the consumer price index. In 1988 this rate is 3.76 cents/kWh (85% of the bulk wholesale rate of 4.4 cents/kWh). The present value of both rates are equal.

Ontario Hydro states that present power purchase rates are "well above" the utility's actual long term avoided cost. Intervenors argued that present rates were "discounted" and/or "well below the cost of new generation".

Background

The delineation of the "costs a utility would have incurred if not for the availability of private sector generation (avoided cost)" is a complex and contentious issue.

Ontario Hydro's system planning method for determining avoided costs should, in theory, approximate the generation costs Ontario Hydro can save by purchasing electricity from independent generators, based on:

a) the running costs (fuel and some operations and maintenance) of the present system until 2001.

b) Interest costs on the deferral of new central generation facilities, fuel and operations and maintenance costs after 2001.

While there are problems with the methodology itself, the most contentious issue revolves around the assumptions Ontario Hydro makes about future costs.

Method

From time to time, Ontario Hydro prepares incremental power and energy tables. September, 1987 was the last time such tables were prepared.

Ontario Hydro runs simulations based on standard load (demand) projections and existing generation resources over a sixty year projection period. When new capacity (power) is forecast to be required, a ratio similar to Hydro's existing generation mix is used to reflect what might be added.

The energy tables are projections of the running costs of the system - fuel, and variable operations and maintenance costs. The simulations follow a forecasted load over the study period. The highest cost unit from a fueling standpoint on the system at any one time, is used to reflect the marginal or incremental kilowatt-hour. At various times this can mean either nuclear, coal, oil or hydraulic units - whichever unit was assumed to be the most recently dispatched.

The energy tables are sound from a methodological standpoint.

The Ontario Hydro incremental power tables, while far less sophisticated than many U.S. utility models, should be able to provide a fair approximation of avoided cost except for two fundamental flaws.

First. Ontario Hydro presumes that the parallel generator will simply delay or defer the requirement for new utility generation. and never replace (or avoid) it. Therefore the power tables only take into account "the economic carrying charge of delaying or advancing a "composite" plant (50% nuclear / 50% Coal. CTUs. Demand Management. Parallel Generators) for the term considered. In other words. Hydro is only paying the interest costs on new capacity. While many utilities consider deferral costs rather than replacement of the utility resource. they use a real fixed charge rate model. This captures a portion of the actual capital costs of building a new station. and not simply interest costs. while raising the capital portion of the rate substantially but more accurately.

Even as the need date for new capacity draws closer. the Ontario Hydro method will only value the capacity of parallel generators at .2 cents kW.h ($1985). simply because that is the interest component of the composite plant. They argue that the "cost attributable to capacity should never exceed the carrying costs for combustion turbines (estimated for Ontario at roughly $70-80/kW/year ($2000)".

However. the second problem is that while hydro correctly assumes their new plant will be more efficient than the existing system and therefore will save more expensive fuel burn from older plants. these savings are subtracted from the capacity value assigned to parallel generators.

If hydro were to correctly follow through with this approach of assigning a low value to power (capacity). all of the capital. operations. maintenance and fueling costs of new plants. less the cost of the cheaper combustion turbine unit. should be added as energy costs. This would raise the energy payment dramatically for parallel generators.

As already discussed. combustion turbine units (CTUs) are the cheapest resource addition to build. but usually the most expensive resource to fuel. CTU's will also only operate for a very few peak period hours a year.

IN ITS SIMPLE TERMS. HYDRO IS SAYING THAT AVOIDED COST IS THE INTEREST (CARRYING CHARGES) ON A COMBUSTION TURBINE UNIT THAT CAN RUN ON CHEAP FUELS (URANIUM. WATER AND COAL). IT IS A MISMATCH - DERIVING BOTH CHEAP CAPACITY AND CHEAP ENERGY FROM THE SAME UNIT.

The consultants agree with Hydro's capacity credit of $70-80/kW/year. But rather than subtracting the energy savings from a new nuclear unit (which Hydro states is its most cost effective addition for energy purposes). the full cost of that unit should be treated as an energy cost and factored in as such to the calculations of avoided cost.

Assumptions

An equally critical problem rests with the assumptions used in formulating the incremental cost tables. Put simply, Hydro forecasts far greater efficiency and prudency in the future than the organization has been able to achieve in the past (particularly in new nuclear development).

A few examples follow. The quotations are from the Ontario Hydro presentation on the afternoon sitting of August 10.

Need for new capacity

> "The last factor is in terms of in-service date, for independent generators who would like to come on to the system next year or the year after. Maybe we do not really need new generating capacity beyond what is under construction for five years, possibly not for 10 years, depending on how successful demand management and so on is." (page 7)

While Hydro has stressed the urgency of the need for new resource additions, and discussed need dates in the 1996-1998 range (high and median forecasts), Hydro's avoided costs are based on no need for new capacity until 2001.

The incremental power tables issued in 1985 assumed that new capacity would be required in 1998. Hydro's justification for extending the need date to 2001 when it issued its 1986 tables was that "a detailed expansion plan is not defined for Ontario Hydro beyond the year 2001". It is not clear what this means, but the impact of this three year move is that, using Hydro's approach, it lowers the calculated avoided cost.

Hydro's past record, and their presentation to the Committee indicate little willingness to offer parallel generators value for the capacity they are offering to Ontario Hydro today, and for the 1990s:

> "In the short term, Ontario Hydro may not need more generating plant and independent generation permits the use of existing generation to be reduced. Here the saving is mostly in fuel." (page 5)

While Hydro and several intervenors argued that there was an immediate need for adding new capacity, and indeed Hydro is intending to add new nuclear and hydraulic units in the 1990s, Hydro's power purchase rate methodology is based on not needing new resources until 2001.

Transmission Savings

Between 1985 and 1986 Ontario Hydro reduced the value of new power by approximately 36%. Mr. Snelson speculated (DT. pg. 46) that this was because projections of coal and fuel prices might have dropped. In fact the reason relates to the removal of any transmission line capital savings. other than a 4% loss compensation adder.

This one dramatic change in assumption allows Ontario Hydro to claim that its present rates are above actual long term avoided cost.

Optimized System and Costs

Put simply. Hydro's approach and calculations have developed power purchase rates that are less than the wholesale cost of power. The present rate was termed by Mr. McConnell as being "well in excess" of Ontario Hydro's long term avoided cost.

Even accepting Ontario Hydro's assumptions about the future ability of its system to operate more efficiently than in the past. numerous witnesses expressed the view that new energy and capacity will cost considerably more than today's average cost of power.

BUT THE PRESENT BUYBACK RATE IS 15% LESS THAN TODAY'S AVERAGE WHOLESALE COST OF POWER.

Conclusion

This paper has discussed only a small portion of the issues relating to Ontario Hydro's avoided cost calculations.

The consultants suggest. as has recently been adopted in Alberta and Nova Scotia. that the fairest and most understandable approach for calculating avoided cost is to pay the full capital and running costs of a new utility plant that public planners have determined as being appropriate to avoid. This could be a new nuclear or coal plant. or a composite.

In addition, Ontario Hydro and the government incur costs that are not captured in the present calculations of avoided cost (loan guarantees, debt reduction, lower tax revenue) that should be partially recognized in the calculations. This inclusion would recognize that there will be extra social benefits to the development of independent projects.

A final comment is necessary with regard to another item discussed by Mr. Snelson during his presentation:

> "We are proposing to use avoided cost as an upper bound on rates and incentives. Paying above the avoided cost would cause unnecessary rate increases and unnecessary increases in electricity bills. This would not be consistent with our general principle of low customer cost is vital."

It is important to recognize the minimal cost implications of such theoretical concerns. The following simple illustration examines the impact of paying independent producers a rate that is in excess of Hydro's version of avoided cost based on information from Hydro's 1987 annual report. Assume that 1000 MWs of parallel generation sold power to Ontario Hydro for 6 cents a kilowatt hour (Hydro actually paid 3.6 cents in 1987 to 25.4 MWs of projects with payments totalling $3,270,000), at a 70% capacity factor.

This comparison simply looks at the average revenue/kWh as it existed in 1987, introduces a substantial block of independent generation, pays rates 66% above Hydro's version of avoided cost, and results in a rate impact of less than 3%.

ONTARIO HYDRO 1987 ANNUAL REPORT

A. Primary energy sales	120,218,000,000	(kWh)
B. Revenue requirement	$5,084,000,000	
C. Average Revenue/kWh	4.23	cents/kWh

ILLUSTRATIVE INDEPENDENT GENERATION IMPACT ON RATES

D. 1,000 MWs @ 70% Capacity Factor	6,132,000,000	(kWh)
E. Avoided Cost (3.6 cents/kWh)	$220,752,000	
F. Payment at 6 cents/kWh	$367,920,000	
G. Amount in Excess of Avoided Cost	$147,168,000	
H. Adjusted Revenue Requirement (B.+G.)	$5,231,168,000	
I. Adjusted Revenue/kWh	4.35	cents/kWh
J. Rate Impact	2.89	%

It is important to recognize that this illustration only examines the running costs of Ontario Hydro's present system. No value is assigned for avoiding the need for new and more expensive capacity additions.

PASSMORE ASSOCIATES Issue Paper # 5

BIDDING
FOR INDEPENDENT GENERATION PROJECTS LARGER THAN 5 MW

ONTARIO HYDRO'S STRATEGY ELEMENTS

4.3 Ontario Hydro will regularly communicate the need for independent generation to potential independent generators; request proposals to contribute to that need; and negotiate detailed terms and conditions with suppliers whose proposals have potential to satisfactorily meet the need.

Discussion

- Bidding was introduced in the United States after the independent generation industry had contracted for over 16.000 MWs of sales and had over eight years of experience. By comparison. Ontario Hydro is making bidding the starting point of its independent generation development strategy.

- The U.S. industry developed initially through a program of standard purchase prices and contracts. In some jurisdictions. limits were set on the amount of development that could proceed in the initial phase.

- For a bidding system to work. a strong. vibrant. Ontario based industry should be in place. Today we have projects representing less than 50 MWs. To gain greater experience and development. the promotion of independent generation would be facilitated by simple. clear. less bureaucratic approaches offering standard contracts for the short term (1988 - 1993).

- Bidding raises transaction costs significantly. Ontario Hydro has suggested that standard prices and contracts exist. but that there is usually some negotiation. Various witnesses (The Waterpower Producers Association. The Independent Power Producers Society. Ontario Natural Gas Association) suggested that government should ensure that the rules are clear. and not "negotiable".

- Bidding will also raise administration costs for Ontario Hydro.

- The consultants believe that bidding holds promise in the medium term. but will limit development in the shorter term. By suggesting bidding now. Hydro proposes to leapfrog the industry development stage. Constrained development in the short term will not permit the independents to demonstrate delivery capability or reliability in time to forego the planning and potential implementation of new Ontario Hydro generation facilities.

PASSMORE ASSOCIATES Issue Paper # 6

TRANSMISSION IMPACTS

ONTARIO HYDRO'S STRATEGY ELEMENTS

5.2.2 Approval for new transmission to incorporate new generation shall be sought as part of the generation approval process.

Discussion

- A crucial assumption in Ontario Hydro's cost analysis is that "the base transmission system would not be affected by the conservation measures". (Report 660SP, pg. 15)

- Independent Generators are expected to pay for any transmission line upgrades that result from their interconnection with the Ontario Hydro system.

William Marcus presented the following evidence to the Committee:

- Pacific Gas and Electric Company estimates that in the long-run, a kilowatt of demand management will avoid 92% of transmission costs associated with a kilowatt of demand and 51% of demand distribution costs on a long-run basis. This amounts to as much as $450 per kilowatt conserved beyond generation costs saved.

- Parallel generation is likely to reduce bulk transmission requirements and line losses because of its dispersed nature and lower voltage output.

- A review of Hydro's transmission cost estimates for the representative plans shows rather unusual results. An all nuclear supply plan, and an all demand management (through raising rates) was analyzed. The "all demand" (AD) plan showed only 6% less transmission investments on a net present value basis over the next 20 years than an "all supply" (AS) plan which added over 8000 MW of capacity to the system. Yet Hydro has recognized that the peak demand for plan AD could be 15% lower than the peak demand for plan AS in the year 2010 and as much as 25% lower than the peak demand for plan AS in intermediate years around the year 2000. This should reduce the need for transmission investments by more than six per cent.

- Even more unusual was the result that plans to distribute resources (some demand management, nuclear, independent generation and coal) had lower transmission costs than the "all-demand" case. Adding generation anywhere will tend to require at least limited amounts of transmission, and higher peak loads would also require more transmission.

- As a result, Hydro's economic evaluations of each of the potential demand and supply options are suspect.

SECTOR SUMMARIES

These summaries were submitted to the Committee as part of Passmore Associates interim presentation to the Committee on October 6, 1988. They are included here for convenience.

Sector Summary - DEMAND MANAGEMENT/ENERGY EFFICIENCY

Essential Rationale:

It is generally cheaper to save energy (kWhs) or capacity (kWs) through demand management (DM) than it is to produce or develop new energy or capacity. DM has the added benefit of no associated transmission costs and lowered reserve margin requirements.

What Are Energy Management Companies Prepared To Do?

- produce and market existing energy management equipment
- research and develop new technologies
- offer innovative financing arrangements to help consumers (industrial. commercial and residential) avoid first cost shock
- provide auditing and design services (for Hydro and/or consumers)
- provide program design and delivery services to Hydro

Current Issues:

1) Power Commission Act currently forbids (energy management) rebates. The Act needs to be amended.

2) Too many unreasonable tests are being applied to demand management.

3) Tough efficiency standards for houses. buildings. motors. lighting. appliances need to be legislated under new Energy Efficiency Act and the Building Code.

4) Hydro needs to foster energy management codes. standards and certification the same way it has done over the years for the supply industry.

5) Current high rates of electrical growth are due in large part to increasing electrical share of space and water heating in commercial and residential sectors. Specific action to de-market electric heat (especially resistance heating) would produce large savings.

What is the Potential for Demand Management?

Enormous. There is massive technical and economic potential at costs well below that of new generation. There is no point disputing the numbers. Look at the evidence from other jurisdictions.

Proposed Action:

- amend Power Corporation Act to promote DM
- set aggressive provincial targets for DM - don't leave targets in Hydro's hands
- move quickly to raise efficiency of new infrastructure
- set out a provincial policy on the space and water heating markets; define preferred fuels; instruct Hydro to discourage resistance heating

Sector Summary - INDEPENDENT GENERATION

Essential Rationale:

Competition in electric generation vs monopoly.

The basic economic principle is that electric generation. unlike transmission. is not a natural monopoly.

What Are Independent Generators Prepared To Do?

- raise their own capital
- do their own operations and maintenance
- only be paid on the basis of their performance (cents/kWh)
- pay taxes on any profit they may make

Current Issues:

1) The value of power - what cents/kWh rate are independents going to be paid for the power?
   (Current approach - The buyback rate is determined exclusively by Hydro with no public. industry or government input.)

2) Standard contracts - terms and conditions.
   (Current approach - Over 5 MWs. contracts are negotiated on an individual project basis. Sweetheart deals are not in the best interest of the ratepayer)

3) Fuel preference - no descrimination on the basis of how the electricity is generated.
   (Current approach - Hydro currently descriminates against gas in favour of small hydro and wood-fired cogeneration. This goes against stated Ministry of Energy preference.)

4) Bidding - Would be premature in Ontario at this time.
   (Current Approach - Hydro is proposing going to a bidding system.)

What is the Potential for Independent Power?

This is unknown. It could be as much as 3000 - 5000 MWs by 2005. The structure is not now in place to permit this power to develop so it is not productive to argue about numbers. Given the current lack of government direction and Ontario Hydro policy. it will be unlikely that 1000 MWs be built by 2000.

Proposed Action:

Issue a challenge to the independent power production industry in Ontario. Offer them full avoided cost for power (as determined by the OEB). standard contract terms and conditions. and a 1000 MW limit to be delivered by January 1 1993. See if they can deliver.

In the post 1993 period. re-evaluate avoided cost and potentially go to bidding if a strong successful industry exists.

ISBN 0-7729-5011-3
(2 V. SET)
ISBN 0-7729-5013-X
(V.2)

12525